The Journal
OF THE
Royal United Service Institution.

VOL. XIV. 1870. No. LXI.

Evening Meeting.

Monday, May 30th, 1870.

VICE-ADMIRAL RICHARD COLLINSON, C.B., in the Chair.

NAMES of MEMBERS who joined the Institution between the Evening Meetings of the 2nd and 16th of May, 1870.

ANNUAL.

Morgan, J. P., Capt. R.A. 1*l.*
Salis-Schwabe, G., Capt. 6th Dragoon Gds. 1*l.*
Brain, D. List. Lieut. 4th K.O.R. 1*l.*
Cavendish, Honbl. C. C. W., Lieut. Cold. Gds. 1*l.*
Dallas, R. C. F., Lieut. 98th Regt. 1*l.*
Sim, C.A., Lieut. R.E. 1*l.*

NAMES of MEMBERS who joined the Institution between the Evening Meetings of the 16th and 30th May, 1870.

LIFE.

Hay, Edward O., Lieut. R.A. 9*l.*
Robertson, F. W., Lieut. 107th Regt. 9*l.*
Stewart, Major J. H. M. S., R.E. Madras. 9*l.*
Hemery, E., Col. retd. f.-p. R.E. 9*l.*
Reeve, Nevill H., Lieut. 45th Regt. 9*l.*

ANNUAL.

Wood, Thomas, Lieut. R.H.A. 1*l.*
Forsyth, Fred. A., Lieut. 5th Fusils. 1*l.*
Milligan, C., Capt. 39th Regt. 1*l.*
Broome, W. A., Ens. 1st W.I. Regt. 1*l.*
Piers, T. T., Lieut.-Col. Bo. Staff Corps. 1*l.*

THE NECESSITY FOR AN INCREASE IN OUR NAVAL STEAM-TRANSPORT FLEET FOR MILITARY PURPOSES.

By Captain J. C. Hoseason, R.N.

The subject which I have this night the honour to bring under your notice is one, to my mind, of vast importance, and demands your most patient investigation, as it involves the question not only of "the "necessity for increasing our Naval Transport Fleet for military pur- "poses," but also the question of who is to have charge of the funds for such purpose, as well as who is to exercise the supreme authority, both at home and abroad, when any combined operations are conducted on the coast of an enemy.

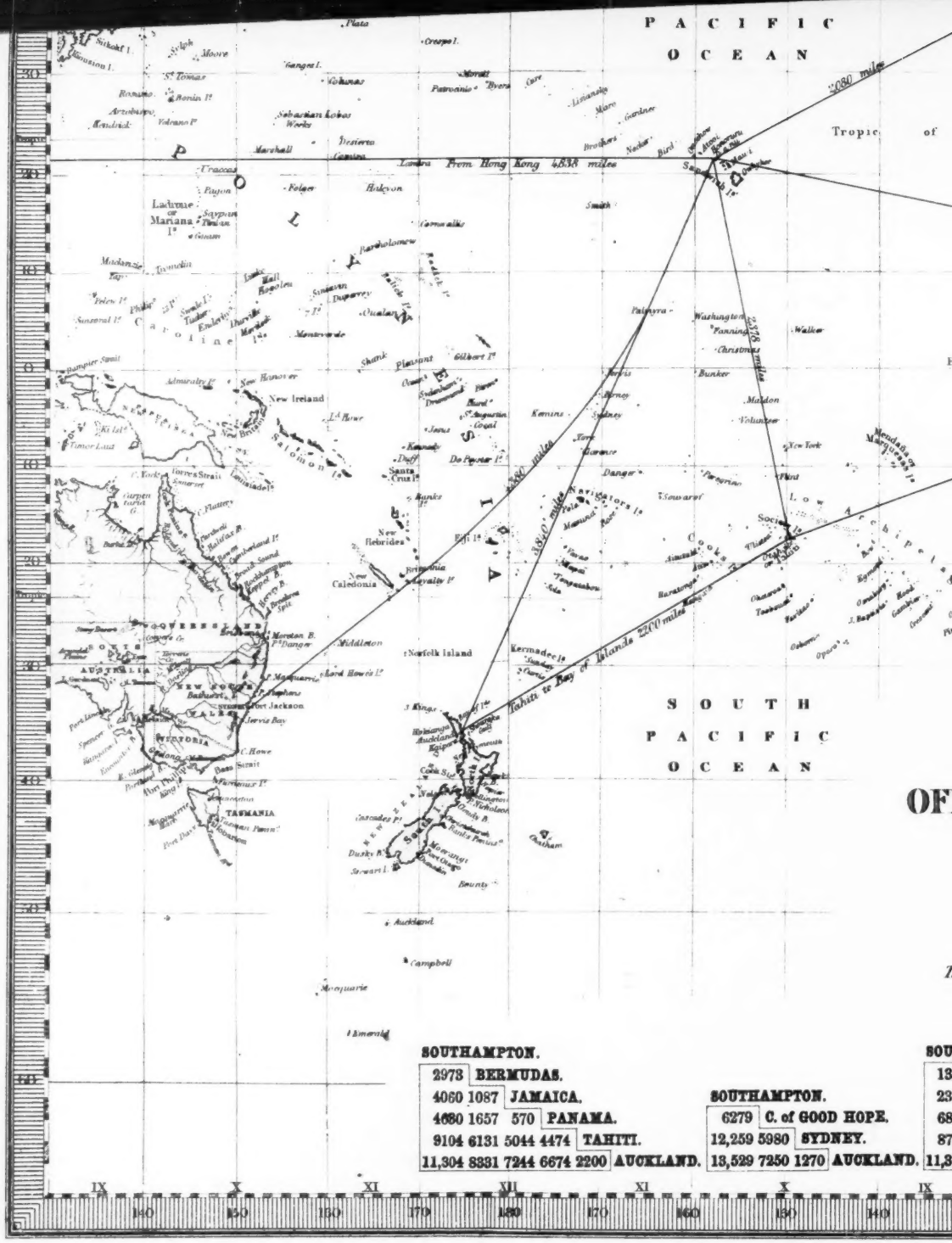
We must, therefore, try to divest ourselves of any professional predilections, and regard the matter both from a military and naval point of view, and see if we can aid the Government in the solution of this vexed question, which has more or less occupied the attention of the authorities both in and out of Parliament for years, and which no doubt will, ere long, lead to further inquiry, as is evident from the following quotation from Lord Strathnairn's Report to the Under-Secretary of State, dated March 23rd, 1867:—

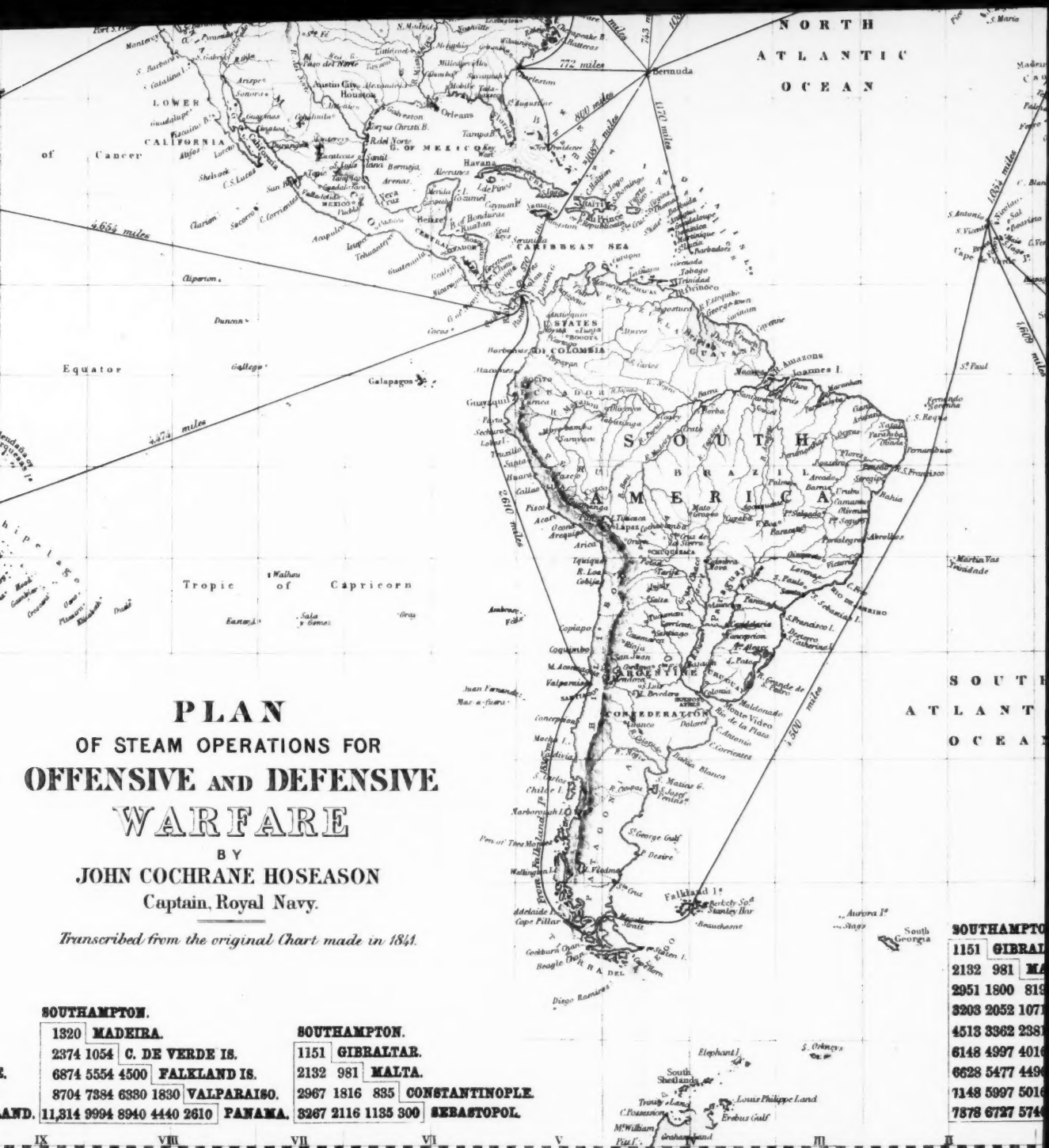
"I venture to request the attention of the Secretary of State to the "very important question of sea transport for Army requirements, and "to the communications which took place on this subject before and "during the sitting of the Committee, between the Under-Secretary of "State and myself. It will be observed that the Under-Secretary of "State thought it best, in the interests of this great question, that the "consideration of it should be reserved till the Committee had closed "their labours on Army transport, with a view to its being treated "separately, the Committee being assisted by an additional member "belonging to the Royal Navy."

Towards the end of this paper will be found my views upon this difficult subject, and I invite a careful consideration of the opinions therein expressed, and a free criticism of its details. In suggesting an increase of the naval transport steam fleet for military purposes, I would direct attention to the fact that since I entered the Navy in 1823, now forty-seven years ago, we have had two China wars, a Syrian war, a Russian war, an Affghan war, an Indian mutiny, and lastly, an Abyssinian war, besides many minor expeditions, such as the Persian war. In all these wars the Army has taken a leading part, and a vast number of transports have been required for the service. But the country has been led into a heavy expenditure and great sacrifice of public property in consequence of the little interest that has been taken during peace in the organization of this branch of the public service, and one which must continue to grow more and more in importance consequent on the decision of the Government to withdraw from the Colonies and concentrate at home nearly the entire body of troops heretofore employed abroad. I have always enter-

ARCTIC OCEAN
Liakhov Islands
New Siberia
Malói
Kotelnoi
Bear I.
Herald I
Point Barrow
Franklins Discoveries
Behring Strait
Burung
Norton Sd.
Unalaklu
belonging to the U. States
Tukuut
Nunivak I.
Bristol Bay
Kuskok
Aleutian Islands
Unalaska
Sitka
New Archangel
Prince of Wales I.
Tobolsk
Yeniseisk
Irkutsk
Yakutsk
Okhotsk
Kamtchatka
Petropavlovsk
Behring I.
OKHOTSK SEA
KAMTCHATKA SEA
JAPAN SEA
Nipon
Yesso I.
Sitkhof I.
Simushir I.
Marcus I.
Plata
Crespo I.
Gaspe I.
Morell
Pescadore
Bonin Is.
Arzobispo
Sebastian Lobas
Mandrick
Volcano Is.
Desierto
Marshall
Caroline
Brothers
Gardner
Nectar
Bird
Tropic of
Tropic
Urracca
Fagon
Folger
Halcyon
Lachoone or Mariana Is.
Guam
Sappan
Tinian
Farmakis
Bartholomew
Smith
Prom. Hong Kong 4838 miles
3080 miles
PACIFIC OCEAN
NORTH
OCEAN
160
150
170
180
170
160
150
140
70
60
50
40
30
20

GRINNELL L.
WASHINGTON LAND
Peabody Bay
U States Sound.
KANE BASIN
ELLESMERE LAND
Cadogan Inlet
PRUDHOE LAND
Inglefield Gulf
Prince Patrick Isl.
BANKS LAND
Liddon Gulf
MELVILLE SOUTH
PRINCE ALBERT LAND
NORTH DEVON
BAFFIN SEA
Lancaster Sound
COCKBURN I.
Scott Inlet
Victoria I.
Coronation G.
Melville Peninsula
FOX LAND
Hogarth Inl.
Fox Channel
HUDSON BAY
Southampton I.
James Bay
LABRADOR
Port Manvers
Sandwich B.
Belleisle Str.
GREENLAND
DANISH AMERICA
Christianshaab
Knighton B.
Julianehaab
Frederikshaab
Godthaab
Disco
Upernavik
Melville Bay
Jakobshavn
Duntra Bay
BRITISH COLUMBIA
VANCOUVER I.
Juan de Fuca Str.
Victoria
Astoria
OREGON
CALIFORNIA
UNITED STATES
Salt Lake
Chicago
New York
Philadelphia
Washington
Baltimore
Richmond
Charleston
Savannah
Augusta
Orleans
Houston
Austin City
Galveston
Corpus Christi B.
Tampa
Key West
G. OF MEXICO
Havana
Matanzas
Cayman I.
Jamaica
Hayti
Port Prince
CARIBBEAN SEA
Bermuda
NORTH ATLANTIC OCEAN
Azores
Fayal
Terceira
S. Miguel
S. Maria
Madeira
Cape Verde
Tropic of Cancer
1,600 miles
2,973 miles
1,890 miles
743 miles
677 miles
772 miles
800 miles
1,170 miles
1,087 miles
4,654 miles
1,864 miles


PACIFIC
OCEAN
Tropic of
London From Hong Kong 4838 miles
5080 miles
4880 miles
5870 miles
2378 miles
Tahiti to Bay of Islands 2210 miles
SOUTH
PACIFIC
OCEAN
Ladrone or Mariana Is
Caroline Is
New Ireland
New Britain
Solomon Is
New Hebrides
New Caledonia
Norfolk Island
Kermadec Is
Society Is
Low Archipelago
Cook's Is
Friendly Is
Navigators Is
Fiji Is
Santa Cruz Is
Admiralty Is
Gilbert Is
Phoenix Is
Line Is
Marquesas
Pitcairn I.
Easter I.
Sala y Gomez
Juan Fernandez
Galapagos Is
Tuamotu Archipelago
Washington
Fanning
Christmas
Palmyra
Bunker
Maldon
Volunteer
Starbuck
Malden
Flint
Penrhyn
Danger
Serrana
Serranilla
Quita Sueno
Roncador
Providencia
Swan Is
Bonacca
Utila
Roatan
Guanaja
Cape Gracias a Dios
Honduras
Nicaragua
Costa Rica
Panama
Jamaica
Cuba
Yucatan
Campeche
Tabasco
Vera Cruz
Mexico
Tampico
Texas
Matamoras
Rio Grande
Sacramento
San Francisco
Monterey
Acapulco
Mazatlan
Guaymas
Lower California
Cape St Lucas
Sandwich Is
Owhyhee
Mowee
Oahu
Atooi
Onehow
Necker
Gardner
Brothers
Bird
Maro
Lisianski
Pearl and Hermes Reef
Midway I.
Ocean I.
Wake I.
Gaspar Rico
Arrecife
Mendanna Is
Marquesas Is
Dangerous Archipelago
Disappointment Is
Oparo
Ducie I.
Henderson I.
Elizabeth I.
Lord Howe I.
Middleton
Sandwich I.
Auckland
Campbell
Macquarie
Emerald
Antipodes Is
Bounty
Chatham
Kermadec Is
Tonga Is
Fiji Is
Navigators Is
Society Is
Cook's Is
Friendly Is
Low Archipelago
Tuamotu Archipelago
Marquesas Is
Pitcairn I.
Easter I.
Sala y Gomez
Juan Fernandez
Galapagos Is
Tahiti
Moorea
Huahine
Raiatea
Tahaa
Bora Bora
Maupiti
Tubuai
Rurutu
Rimatara
Raivavae
Oheteroa
Mangareva
Gambier Is
Pitcairn I.
Henderson I.
Ducie I.
Oeno I.
Easter I.
Sala y Gomez
Juan Fernandez
Galapagos Is
Tuamotu Archipelago



PLAN

OF STEAM OPERATIONS FOR

OFFENSIVE AND DEFENSIVE

WARFARE

BY

JOHN COCHRANE HOSEASON
Captain, Royal Navy.

Transcribed from the original Chart made in 1841.

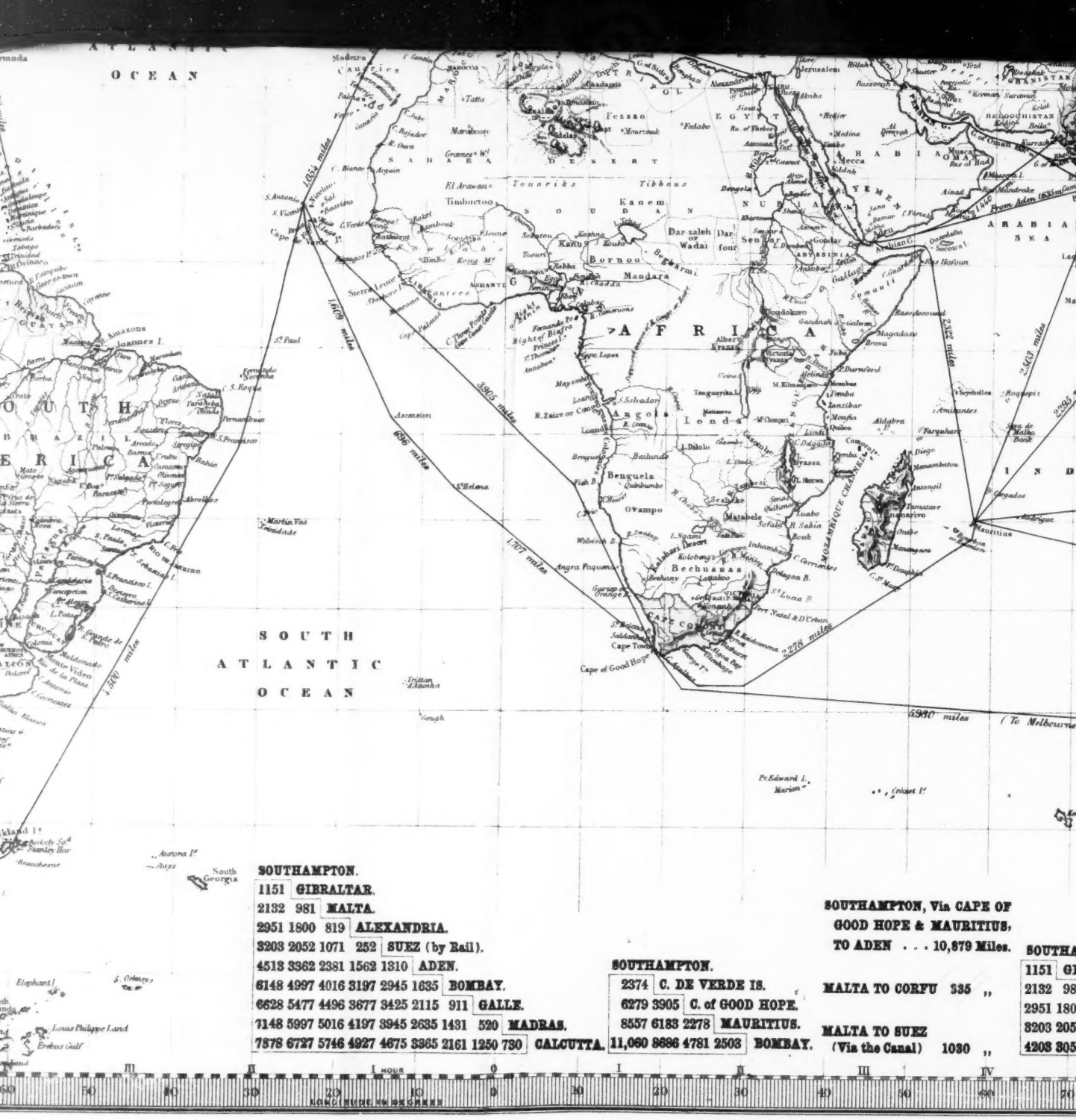
SOUTHAMPTON.	
1320	MADEIRA.
2374 1054	C. DE VERDE IS.
6874 5554 4500	FALKLAND IS.
8704 7384 6330 1830	VALPARAISO.
11,314 9994 8940 4440 2610	PANAMA.

SOUTHAMPTON.	
1151	GIBRALTAR.
2132 981	MALTA.
2967 1816 835	CONSTANTINOPLE.
3267 2116 1135 300	SEBASTOPOL.

SOUTHAMPTO	
1151	GIBRAL
2132 981	MA
2951 1800 819	
3203 2052 107	
4513 3362 238	
6148 4997 401	
6628 5477 449	
7148 5997 501	
7878 6727 574	

GREENLAND
DANISH AMERICA
ICELAND
EUROPE
ASIA
AFRICA
NORTH ATLANTIC OCEAN
NORTH SEA
SCOTLAND
IRELAND
Hebrides
Orkneys
Shetlands
Edam Land
Spitzbergen
North east L.
South Waygat
Thomen Fiord
Bear I.
Hope I.
Nassau Land
Foster B.
Bontekoe
C. Parry
Liverpool I.
Jan Mayen I.
Knighton B.
Greenwich Fiord
Ritenbenk
Omenaarshaab
Egedes Fiord
Ekallumiut
C. Dan
C. Farewell
C. Nord
Hecla
Skaftholt
Hecla
Reikiavik
Hafnia
Hafnia
Lavgansnes
Faroe Is.
Sudero
Kinderoe
Osteroe
Lapland
White Sea
Archangel
Mezen
Kola
Kandalaksha
Uleaborg
Tornea
Torneaa
Kemi
Waranger Fiord
North Cape
Tromsoe Fiord
Ringvaldsnes
Loffoden Isles
Malangen
Kolguev
Vaigatz
Vaigatz Str.
Vershka Is.
C. Nassyndon
Fornes C.
Matotchkin Str.
C. Gousinoi
Tchaa
Sea of Kara
Kotlin I.
Kotelnoi I.
Kotelnoi C.
Sobsin
Obdorsk
Beresov
Berezov
Tobolsk
Batenkina
Tiumen
Tara
Ekaterinburg
Omsk
Irtish R.
Kirghis Tartars
Kirghis Steppe
Orsk
Orenburg
Samara
Saratov
Astrakan
Caspian Sea
Aral
Khiva
Bokhara
Turkestan
Tashkend
Khokand
Kashgar
Yarkand
Khotan
Aksu
Kuldja
Turfan
Hami
Barkul
Gobi
Mongolia
Chinese Empire
Pekin
Nankin
Canton
Macao
Hong Kong
Formosa
Manilla
Philippine Is.
Borneo
Celebes
Java
Sumatra
Singapore
Malacca
Penang
Andaman Is.
Nicobar Is.
Ceylon
Colombo
Point de Galle
Madras
Pondicherry
Calicut
Goa
Bombay
Surat
Cambay
Gulf of Cambay
Diu Head
Kurrachee
Hyderabad
Tatta
Mooltan
Candahar
Cabul
Ghuznee
Peshawur
Attock
Lahore
Umritsir
Loodiana
Delhi
Agra
Allahabad
Benares
Calcutta
Patna
Dacca
Chittagong
Arracan
Ava
Pegu
Martaban
Siam
Bangkok
Cochin China
Tonquin
Hainan
Amoy
Foochow
Ningpo
Shanghai
Nankin
Pekin
Tientsin
Nagasaki
Japan
Yedo
Osaka
Kioto
Sea of Japan
Kamtschatka
Behring's Str.
Behring's I.
Copper I.
Aleutian Is.
Unalaska
Sitka
Nootka Sd.
Vancouver I.
Queen Charlotte I.
Fuca Str.
Columbia R.
Oregon
California
San Francisco
Monterey
Acapulco
Mexico
Vera Cruz
Tampico
Rio Grande
Texas
Galveston
New Orleans
Mississippi R.
Florida
Key West
Havana
Cuba
Jamaica
Kingston
Hayti
Port au Prince
Cape Haytien
Porto Rico
St. Thomas
Barbadoes
Trinidad
Tobago
Grenada
St. Vincent
Martinique
St. Lucia
Guadaloupe
Antigua
Montserrat
Nevis
St. Kitts
Dominica
Barbuda
Bermudas
Halifax
Nova Scotia
Cape Breton I.
Prince Edward I.
Anticosti I.
Gaspe
Quebec
Montreal
Kingston
Toronto
Niagara
Lake Ontario
Lake Erie
Lake Huron
Lake Michigan
Lake Superior
Lake Winnipeg
Hudson's Bay
Labrador
Newfoundland
St. John's
Cape Race
Cape Ray
Cape Breton
Gulf of St. Lawrence
Belle Isle Str.
Davis Str.
Baffin's Bay
Lancaster Sd.
Barrow Str.
Melville I.
Banks Land
Prince Patrick I.
Prince Albert Land
Victoria Land
Wollaston Land
Parry Is.
Cornwallis I.
Beechey I.
Byam Martin I.
Melville Sd.
Prince of Wales Str.
Boothia Felix
Gulf of Boothia
Fury and Hecla Str.
Regent Inlet
Prince Regent Inlet
Admiralty Inlet
Navy Board Inlet
Barrow's Str.
Lancaster Sd.
Jones Sd.
Smith Sd.
Kane Basin
Hall Basin
Robeson Channel
Grinnell Land
Franklin Pierce Bay
Humboldt Glacier
Petermann Gletscher
Victoria Head
Cape Bathurst
Cape Parry
Franklin's Point
Mackenzie R.
Great Bear L.
Great Slave L.
Athabasca L.
Athabasca R.
Peace R.
Slave R.
Fort Simpson
Fort Norman
Fort Resolution
Fort Chipewyan
Fort Vermilion
Fort Dunvegan
Fort Liard
Fort Halkett
Fort Nelson
Fort Simpson
Fort Rae
Fort Confidence
Fort Enterprise
Fort Franklin
Fort Good Hope
Fort Anderson
Fort Yukon
Fort Selkirk
Fort Reliance
Fort Hearne
Fort Churchill
Fort Prince of Wales
Fort York
Fort Albany
Fort Moose
Fort Severn
Fort Rupert
Fort Nascopie
Fort Chimo
Fort George
Fort Mackenzie
Fort Edmonton
Fort Pitt
Fort Carlton
Fort Battleford
Fort Qu'Appelle
Fort Ellice
Fort Pelly
Fort Alexander
Fort Garry
Fort Frances
Fort William
Fort Wrangel
Fort Simpson
Fort Stikine
Fort Taku
Fort Durham
Fort Kilisnoo
Fort Tongass
Fort Langley
Fort Hope
Fort Colville
Fort Walla Walla
Fort Boise
Fort Hall
Fort Lemhi
Fort Bridger
Fort Laramie
Fort Pierre
Fort Union
Fort Benton
Fort Clark
Fort Berthold
Fort Ridgely
Fort Snelling
Fort Crawford
Fort Dearborn
Fort Wayne
Fort Gratiot
Fort Mackinac
Fort Niagara
Fort Erie
Fort Detroit
Fort Pontchartrain
Fort Duquesne
Fort Pitt
Fort Cumberland
Fort Frederick
Fort Edward
Fort Ticonderoga
Fort Crown Point
Fort Chambly
Fort St. John
Fort Richelieu
Fort Frontenac
Fort Oswego
Fort Stanwix
Fort Schuyler
Fort Miami
Fort Wilkinson
Fort Madison
Fort Armstrong
Fort Edwards
Fort Howard
Fort Winnebago
Fort Gibson
Fort Towson
Fort Jesup
Fort Brown
Fort Polk
Fort Wilkinson
Fort Hawkins
Fort Mitchell
Fort Mims
Fort Claiborne
Fort Stoddert
Fort Adams
Fort Jackson
Fort Bowyer
Fort Pickens
Fort Barrancas
Fort Marion
Fort Moultrie
Fort Sumter
Fort Johnson
Fort Hamilton
Fort Lafayette
Fort Columbus
Fort Wood
Fort Schuyler
Fort Independence
Fort Warren
Fort Adams
Fort Trumbull
Fort Constitution
Fort Mifflin
Fort Delaware
Fort Washington
Fort Severn
Fort Carroll
Fort Madison
Fort Monroe
Fort Calhoun
Fort Norfolk
Fort Nelson
Fort Powhatan
Fort Caswell
Fort Johnston
Fort Macon
Fort Hatteras
Fort Clinch
Fort Marion
Fort Pulaski
Fort Jackson
Fort Gaines
Fort Morgan
Fort Pickens
Fort Barrancas
Fort Marion
Fort Moultrie
Fort Sumter
Fort Johnson
Fort Hamilton
Fort Lafayette
Fort Columbus
Fort Wood
Fort Schuyler
Fort Independence
Fort Warren
Fort Adams
Fort Trumbull
Fort Constitution
Fort Mifflin
Fort Delaware
Fort Washington
Fort Severn
Fort Carroll
Fort Madison
Fort Monroe
Fort Calhoun
Fort Norfolk
Fort Nelson
Fort Powhatan
Fort Caswell
Fort Johnston
Fort Macon
Fort Hatteras
Fort Clinch
Fort Marion
Fort Pulaski
Fort Jackson
Fort Gaines
Fort Morgan
1600 miles
2973 miles
1870 miles
1854 miles
Azores
Flores
Fayal
Pico
Terceira
St. Miguel
St. Maria
Madeira
Canaries
Tenerife
Palma
Ferro
Gomera
Grand Canary
Lanzarote
Fuerteventura
Cape Verde Is.
St. Antonio
St. Vincent
St. Nicolas
Sal
Bonavista
Mayo
Fogo
Brava
Cape Verde
Gibraltar Strait
Ceuta
Tangier
Tetuan
Tarifa
Algeciras
Gibraltar
Malaga
Almeria
Cape de Gata
Cape Palos
Cape Tenez
Cape Bajador
Cape Blanco
Cape Bojador
Cape Blanco
Cape Bianco
Arguin
Portendic
Mogador
Saffi
Mazagan
Azamor
Rabat
Salee
Fez
Mequinez
Morocco
Tafilet
Tuat
Ghadames
Mourzouk
Fezzan
Fezzan
Fedabo
Tripoli
Tripoli
Tripoli

T I C O C E A N
Northeast Cape
St Peters I.
Liakhov Islands
New Siberia
Maloi
Tschaun I.
Kolyma Bay
Anadyr R.
Anadyrsk
Penginsk
Ochotsk
Stanovoi Mountains
Yablonoi M.
Aldan R.
Lena R.
Yakutsk
Irkutsk
Baikal L.
Angara R.
Yenisei R.
Obi R.
Tobolsk
Tomsk
Barnaul
Omsk
Semipalatinsk
Orenburg
Astrakhan
Caspian Sea
Aral Sea
Lake Balkash
Gulf of Ob
Gulf of Tobolsk
Gulf of Penginsk
Sea of Okhotsk
Kamtchatka Sea
Bering I.
Aleutian Is
Japan Sea
Yellow Sea
China Sea
Bengal Sea
Andaman
Formosa I.
Hainan I.
Paracels
Philippine Is
Ladrone or Mariana Is
Guam
Pagon
Folger
Halcyon
Cornwallis
Bartholomew
Marshall
Caroline
Arrecifos
Volcano Is
Bonin Is
Rosario
Sebastian Lobos
Desierta
Plata
Crespo I.
Gangsa I.
Columas
Moore
Sulphur I.
Nankin
Shanghae
Canton
Hong Kong
Macao
Tonquin
Siam
Ava
Calcutta
Madras
Pondicherry
Lahore
Delhi
Agra
Jeypoor
Candahar
Cabul
Yarkand
Khotan
Kuenlun M.
Thibet
Himalaya M.
Mongolia
Great Desert
Chinese Empire
Manchuria
Corea
Yeso
Saghalian
Nipon I.
To Sandwich Isles P 4838 miles
Urracas
Mackenzie



SOUTHAMPTON.										
1151	GIBRALTAR.									
2132	981	MALTA.								
2951	1800	819	ALEXANDRIA.							
3203	2052	1071	252	SUEZ (by Rail).						
4513	3362	2381	1562	1310	ADEN.					
6148	4997	4016	3197	2945	1635	BOMBAY.				
6628	5477	4496	3677	3425	2115	911	GALLE.			
7148	5997	5016	4197	3945	2635	1431	520	MADRAS.		
7878	6727	5746	4927	4675	3365	2161	1250	730	CALCUTTA.	

SOUTHAMPTON.	
2374	C. DE VERDE IS.
6279	3905 C. of GOOD HOPE.
8557	6183 2278 MAURITIUS.
11,060	8686 4781 2503 BOMBAY.

SOUTHAMPTON, Via CAPE OF GOOD HOPE & MAURITIUS, TO ADEN . . . 10,879 Miles.

MALTA TO CORFU 335 ,,

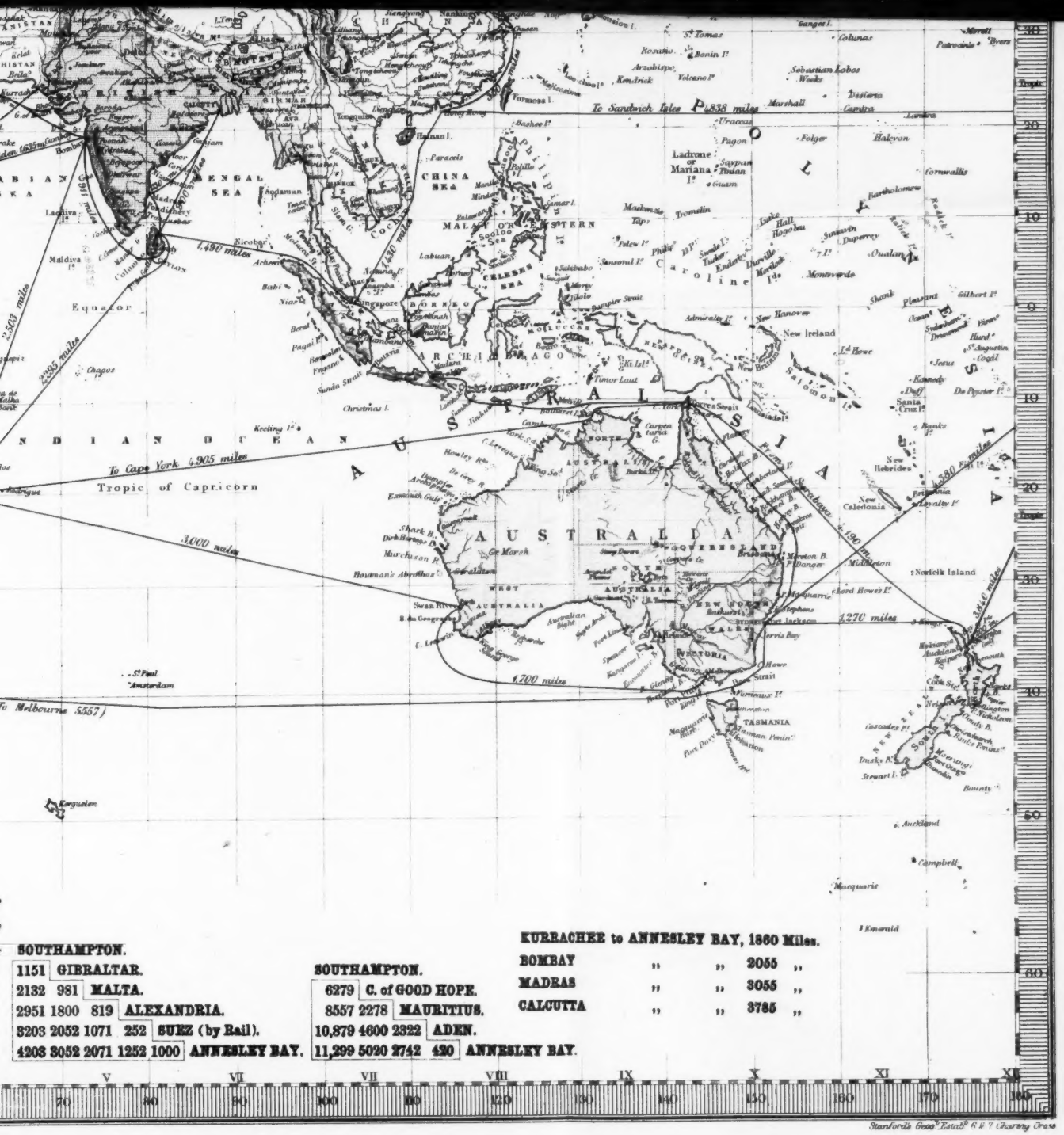
MALTA TO SUEZ (Via the Canal) 1030 ,,

SOUTHA	
1151	GI
2132	98
2951	180
3203	205
4203	305

III II I HOUR 0 I II III IV

60 50 40 30 20 10 0 10 20 30 40 50 60 20

LONGITUDE IN DEGREES



SOUTHAMPTON.

1151	GIBRALTAR.				
2132	981	MALTA.			
2951	1800	819	ALEXANDRIA.		
3203	2052	1071	252	SUEZ (by Rail).	
4203	3052	2071	1252	1000	ANNESLEY BAY.

SOUTHAMPTON.

6279	C. of GOOD HOPE.			
8557	2278	MAURITIUS.		
10,879	4600	2322	ADEN.	
11,299	5020	2742	420	ANNESLEY BAY.

KURRACHEE to ANNESLEY BAY, 1860 Miles.

BOMBAY	,,	,,	2055 ,,
MADRAS	,,	,,	3055 ,,
CALCUTTA	,,	,,	3785 ,,

Stanford's Geog.l Estab.t 6 & 7 Charing Cross

tained the opinion—since the introduction of steam to the purposes of war—that such a measure was most advisable, and the military map which accompanies this paper will, I conceive, carry that conviction to the mind of all parties. It will be perceived, for instance, at a glance, how impossible it would be to defend Canada, in the event of any hostilities with America, by any amount of British troops which we might retain in that country; but most important aid could be rendered by a counter-attack, made by a combined naval and military force along the entire coast line of America, and having for its base of operations so many important Colonial possessions.

We could well afford now, to engage in enterprises of this nature in consequence of the certainty with which we can calculate on all operations to be performed by an efficient steam fleet, and especially since the armament and organization of our reserve forces, together with the completion of those important defensive works in various portions of this kingdom, have freed us from the dread of any combined attack upon our own shores. Military men underrate, in my opinion, the amount of sea transport required to move any large body of men, munitions of war, and animals, and they do not appreciate the danger of performing such an operation in vessels of but moderate burthen, or in open boats, such as Napoleon constructed at Boulogne and other portions of the French coast.

Since the idea of employing ships as steam-rams has been adopted as part of our system of naval tactics, the danger of any such enterprise will be most apparent, for all our vast mercantile steam fleet will, during war, from their great speed and large tonnage, be most formidable enemies to encounter during the transit, even should the Channel be denuded of its naval fleet by any extraordinary mismanagement. The effect of a blow struck in such cases will be as the relative displacement of the vessels multiplied by the velocity with which they are propelled; large ocean boats will, therefore, run over the smaller ones, as a charge of cavalry would over a flock of sheep. This transparent truth must be patent to all parties who have lately read in the public journals the accounts of collisions of vessels at sea.

As we have near upon a million of tons of ocean steam-boats possessing great speed and of large dimensions, we consequently possess, and we alone of all nations possess, a most formidable auxiliary power, which during a great European war would be instantly available to act against such invading Army, despite the covering force of men-of-war which might accompany the expedition.

The application of steam power to the purposes of war has not bridged the Channel, as many who have regarded the question superficially would lead the world to imagine. The entire mercantile sailing marine of this great nation is being rapidly displaced by steamers, and thus the maritime resources of this country are annually greatly on the increase. Steam-vessels of small burthen as transports cannot be safely employed on such service, and vessels of great tonnage take a long time in their construction; the authorities charged with the defence of our shores would have ample time, therefore, to provide the necessary means to cope with such attempt at invasion.

The Admiralty will not, moreover, in any future war be required to employ men-of-war for convoys; the speed of our mercantile steam-marine will be their best defence, and the beautiful geographical position of our vast colonial possessions all over the globe, as shown on the map, will afford them snug havens to resort to for protection and for the replenishment of their fuel.

Our insular position, since the introduction of steam as a motive power, has evidently greatly added to our military strength, and economised our means of carrying on warfare; but it is of little use to organize our Army, and to place its transport on an efficient footing, unless we at the same time study its connection with the Navy, and labour to combine their general efficiency as a whole.

Operations to be effective in any future war must be conducted by the Army and the Navy upon sound military principles, while if results in any way proportionate to our vast expenditure are to be expected, their simultaneous action must be directed by one head, and, as is now very generally admitted, it is only in the department of the Minister at War that such combined system can be fully matured—a department especially organized for this purpose, in a position to collate all the necessary information, and to direct the united strength of both services to one common end.

It is a great fallacy to suppose that we are not a great military nation because we are not inflicted with the misery of conscription. Our great wealth and natural predilection for the profession of arms, together with our insular position, free us from the necessity for all such arbitrary measures. We have but to enumerate the essentials of great military strength to perceive our own superiority. Prussia, for example, now become one of the first military nations of Europe, cannot be compared with us in density of population, wealth, great mineral and mechanical resources, facilities of communication both by sea and land, and in a natural apitude for war. No nation can raise by voluntary enlistment an equal force, and no nation would have a chance in active warfare against us if only we utilised to the utmost our naval, military, and colonial resources; but the mode of effecting this is a great study in itself, and requires a full and accurate knowledge, not only of our own resources, but also of those of every nation on the face of the earth.

The commercial interests of this country are so widely spread, that it is impossible to foresee the moment when our forces will again be called into the field, or with what nation we may be next engaged; but one fact is most apparent, that our chief power lies in the rapidity and economy of our transport by sea, which our wealth and our command of the ocean enable us fully to develope. England, therefore, as a fundamental principle, ought never to permit herself to be drawn far from the sea-base of her operations. The military axiom stated by General Trochu, "Les difficultés, et les risques, d'une "guerre, sont, abstraction faite de toute autre considération, directe-"ment proportionels à la distance où on la fait," is only strictly true when applied to land forces. Our success in ocean steam navigation has long justified us in disregarding distance, and enabled us to resolve

all questions upon war to the one element—time. But it is essential that our operations should never be hampered by the employment of sailing vessels. The economy of steam transport over every kind of land transport is so great that we may be assured of the power of exhausting the strength of any nation with whom we may be at war, without seeking to engage them in any vast numbers; it is disease and exposure which tell upon an army harassed by long marches and counter-marches. The deaths in the field of battle are as nothing to the loss thus inflicted, and more especially if the enemy should have an extended coast line; an efficient steam sea-base therefore, is of vital importance to secure success to our military operations, and it is certain that any required amount of land transport can be conveyed by sea most rapidly and economically, for the world's resources are open to that nation which holds the dominion of the seas, and which, by the aid of steam, can gather from the most distant quarters of the globe the necessary supplies for the maintenance of its armies in the field.

The greatest misconceptions are entertained with respect to our ability to transport with ease and economy a large military force, with cavalry and artillery, and the requisite vast amount of the munitions of war. It will be found, however, that a steamer of 2,500 tons register, engaged at 50*s.* a ton per month during the late Crimean war, cost the Government in round number £200 per day, exclusive of the expense of fuel. The engines of such steamer consume about sixty tons a day, and thus, if the average price of fuel be £3 per ton, the entire cost of the steamer to Government, coal included, will be £380 per day. Such vessel will, however, carry 1,500 men, and 500 tons of munitions of war, and will average in speed about ten knots an hour, or 240 miles a day. Consequently we have one man, and, in round numbers, 7 cwt. of munitions of war moved 240 miles for 5*s.*, or at the rate of one farthing a mile. Now, contrast this with the land transit. The load for a horse or mule upon the march is at most 2 cwt., therefore ten mules are required for every ton, or twelve, allowing two spare animals; thus, to move the 500 tons above-mentioned, would require 6,000 mules, which, at the moderate estimate of £30 a mule as the value of the animal at the seat of war, will amount to £180,000, whilst the entire value of the steamer was only £96,000 to the Company from whom she was hired—a difference of £84,000. Again, the price of the fuel is only to be added to the freight of the steamer when the vessel is in motion, and this may be termed the food of the engines, but the mules must be fed even when unemployed. The maintenance of such an animal in England requires about 12*s.* a week, but can hardly be taken at less than twice that sum at the seat of war; therefore the 6,000 mules will cost £7,200 weekly, or £1,028 a day, while the food of the engines is only £180 a day. To this must be added the great demand for attendance on the baggage animals, the wages and food for the men, and, if one man be allowed for every two mules, 3,000 men will be required, whereas the complement of the steamer is but 126 men, officers included, a difference equal to about three regiments. Should carts be employed, the number of animals will, of course, be considerably reduced, but there will be the original

cost of the cart, and the expense of keeping it in repair; and, in either case, the great additional expense of the loss of animals, caused by stress of weather, scarcity of fodder, and other casualties, must not be lost sight of, whilst the £200 a day paid for the hire of the steamer includes every expense. In reference to time, however, and its important bearing upon war, the case merits far greater consideration, for a mule cannot travel with a convoy, for any lengthened period, at an average of more than ten miles a day, while a steamer travels 24 times faster, or effects, with the additional burthen of 1,500 men, the same distance in one day which it takes the mule 24 days to accomplish.

It will be observed that, for simplicity, I have compared the land and the water transit, calculating the mile in both cases as of equal length; but the nautical mile being 2,000 yards, and the land mile only 1,760, about 240 nautical equal 277 land miles.

It appears to me to be simply impossible to refer to the practice of the late Duke of Wellington in the Peninsula as a guide to the line of conduct to be pursued in the present day. Steam ships were virtually unknown in 1809. Railroads and electric telegraphs had never been imagined; the average size of transports in the Tagus varied from 150 to 330 tons, and a transport of 500 tons burden was then a rarity. In fact, all is now changed consequent upon the vast increase of the size of our present transports, the improvements in ship-building, and the introduction of steam as a motive power. The transport of horses, and of all kinds of munitions of war, including the heaviest ordnance, is an operation of no difficulty in the present day, and the rapidity and economy of such mode of transport is perfectly marvellous when the facts are, as they ought to be, carefully investigated.

I have proved that a steamer of 2,500 tons burden will convey and did convey during the Crimean war, one man and 7 cwt. of *materiel* 240 nautical miles for 5*s*., or at the rate of one farthing a mile; but this same class of steamer has been proved capable of carrying 250 horses, 250 cavalry soldiers, and 500 tons of munitions of war at the same rate, and at a cost of £380 per day. Now, it is clear from the above-named items, that the entire charge for the expenses of the vessel must necessarily be divided under these three several heads. At the rate of 240 nautical miles a day, a steamer will, in 14 days, accomplish a distance of 3,360 miles; the daily cost of the vessel to Government being £380, the entire voyage of 3,360 miles would require an expenditure of £5,320, of which £1,500 is due to cargo, £875 to the men, and £2,945 to the horses; each horse, therefore, will cost about £12 for conveyance for the above distance. The space demanded for the fodder for the horses, for a voyage of 14 days, is an item of mere fractional importance in a vessel of 2,500 tons, being only about 30 tons, and with respect to water for the animals, in all well-arranged steamers conveying horses or men, three times the quantity necessary can be condensed daily from the sea water. It is obvious that a great economy is to be effected by a judicious mixture of the cargo; but even a much greater saving could be obtained at a very small sacrifice of the mean speed of the vessel, by directing every steamer so employed, to tow a fine clipper built sailing ship of about one-third of

her own tonnage, which vessel might be laden with *materiel* of all kinds. Less than one mile and a half an hour will, in moderate weather, be the average loss of speed on the entire voyage, therefore a steamer would not be retarded more than three days in a run of 3,360 miles, whilst the average voyage of the sailing-vessel would be accelerated 43 days by being taken in tow, and consequently 43 days' freight saved to the country.

The advantage which we derive from a steam water-transport and the command of the sea has not been sufficiently dwelt upon, and its full value has never been realised, but it is imperative that this matter should be fully considered, and the transport fleet brought into a state of thorough organisation, if this nation is to maintain its position in the face of the vast armaments now forming all over Europe. Wars have always been found enormously expensive when conducted from a lengthened base of operations on land, consequent upon the necessity for keeping a huge force over the entire line of communications, and upon the greater sacrifice of men, animals, and "*materiel*" from the more constant exposure to the elements, and the greater fatigue of the necessary transit.

It has been calculated that the conveyance of a ton of goods drawn by one horse in a good cart on a good road, will cost 1*s.* 3*d.* a mile. The waggon transport is, however, limited in speed, and in its most improved state does not exceed 24 miles a day; but neither can such speed be obtained, nor such weight be drawn, even by the best carts upon bad roads; and nothing can more readily conduce to the destruction of a lengthened line of communication than the continuous transport of munitions of war. A ton weight is 2,240 lbs.; and on referring to the late Crimean war, we observe that the Maltese carts were never computed to carry more than 600 lbs. or 700 lbs. each. Commissary-General Filder informs us that even the French four-horse waggons in the Crimea were only capable of conveying 2,000 lbs.; but taking the first favourable instance, and supposing a horse to be capable, during a campaign, to move one ton a day 24 miles at the cost of 1*s.* 3*d.* per mile—1*s.* 3*d.* per mile amounts in round numbers to £6 for every 100 miles,—consequently every ton will cost £30 for 500 miles of transport, and it follows that 500 tons of munitions of war (the same quantity as carried by a steamer of 2,500 tons, in addition to 1,500 men and officers) moved 500 miles, will be at a charge of £15,000; and supposing 24 miles a day to be accomplished, which is granting an impossibility, 21 days will be required for the transit. Thus we perceive that the expense of transporting 500 tons for 500 miles by land will nearly equal the cost to our Government of the hire of three steamers of 2,500 tons burthen, conveying their enormous cargoes a distance of 3,360 miles, in the highest state of condition, and at the rate of 240 nautical miles a day. It is curious to observe that the difference in distance between 240 nautical and 240 land miles, is 37 miles, which few soldiers are able to accomplish daily, even over good roads, for any lengthened period, and which the Prussians only accomplished in their forced marches by pressing into their service the country carts to convey their knapsacks.

The correctness of the above figures used by me to illustrate my arguments, may in some measure be called in question, according to the different views entertained by parties more or less conversant with the facts of the case; but such criticism will not affect my general position, nor materially lessen the comparative economy of the use of steam-ships for the purposes of war.

I have taken no extreme case to illustrate my arguments, as I shall satisfactorily prove in my rejoinder, should the fairness of my reasoning be called in question.

It has become a question of grave importance that we should maturely reflect upon our present altered condition—the agency of steam and the electric telegraph have totally changed our relative position, not only with our own dependencies, but with the rest of the world.

India itself has grown into a vast and rich empire, with a revenue nearly equal to our own, and with a population five times greater than this country, and peopled by races who love to follow the profession of arms, as has been stated by the late Commander-in-Chief of the Army. If Russia held India, how long would it be before she turned to account this natural predilection for the profession of arms? Any demand for men from that country in the event of another war with Russia, can now be communicated in a few hours, and we no longer take twelve months to perform a voyage out and home. We ought not, therefore, to look at the question as one of distance, but simply as one of time.

Lardner, writing in 1850, states—"It is calculated that of the entire "inhabited part of the globe, roads do not exist in more than *two-* "*sevenths;* the extensive empire of Russia, with the exception of one "or two main communications, such as between St. Petersburgh and "Moscow, is without them."

Let us see the effect of such a state of things as described by Chambers, in his History of the late Russian War.

"The advanced guard of Osten Sachen's corps arrived at Bucharest "in miserable condition, having been forced to march during 50 days "over the worst roads in pelting rain, and falling in fearful numbers "by the way; the poor fellows, too, after barely three days' "rest, were ordered on to Kalafat, a further distance of 200 or 300 "miles."

This march, then, of only 500 miles was performed at the rate of 10 miles a day, and, therefore, occupied as much time as a fine steamer of the present day would require to run to Bombay and back *viâ* the Isthmus of Suez, a distance of 12,296 nautical miles; but for all operations in the East no such distance would have to be traversed.

I therefore conceive that we shall never realize, to its full extent, the advantage to be derived from the adaptation of steam as a motive power, until we shall have matured our plans for carrying war into an enemy's country. It is by an efficient steam-fleet conveying a flying army, and not by blockading squadrons, that we shall possess the power to keep the coast line of an enemy in a fever of alarm; no town within 15 or 20 miles of the sea should be safe from a nocturnal visit, and the terror which a well-organized flying Army acting on an

enemy's coast would create, must paralyze a force of twenty times its strength. It is a well-known fact, that although our fleet in the Baltic during the Russian war was known to be unsupported by such military force, yet its appearance from time to time at different points of the coast, caused the Russian Government the greatest anxiety, and obliged their troops to make the most harassing marches,—the fatigue and exposure consequent upon such marches always destroying an Army far more rapidly than either the ball or the bayonet.

This is a question for combined operations both by sea and land. With every predilection for my own profession, I am painfully sensible of the fact, that in the late Russian war, the Navy, comparatively speaking, did nothing, especially in the Baltic; they could not take Bomarsund without sending for a French Army, nor could we enter the Sea of Azov and cut off the Russian supplies pouring into Sebastopol until a military force took possession of the fortifications that guarded the entrance; even a miserable little place like Kinburn could not be attacked without the aid of our excellent allies, although only 5,000 troops were required for the operation. The humiliating position we held during that war has stirred up the martial feeling of the country, and it is the object of this paper to suggest the means for still further developing our resources.

We are no longer merely a great naval nation, but a great military nation; and if I reason correctly, the first military nation in the world. I invite those who may debate this question to inspect with care the military map I have placed in their hands; let them regard Prussia's position for example: at any moment she is liable to be attacked from all quarters, by Russia, Austria, and France; no real difficulties exist to impede the march of the invader; no preparations are needed; all are admitted to be completed. A secret alliance may combine all these forces against her; the armies can be mobilized in a week, and the frontier passed, and the resources of the country seized upon by an invading enemy, while a combined naval attack might operate along her entire seaboard, for as yet her men-of-war could not make head against any such united operations.

The same argument can be applied with more or less force against all the Continental powers. Prussia succeeded in her campaign against Austria, and why? because all other powers were neutral, and because her plan of campaign had been maturely weighed and considered by the Minister of War during a time of peace, and the entire resources of the country made subordinate to one head. It was the unity of design in the operations that secured the victory—not mere superiority in the arms. It was thus that Napoleon often succeeded when his most celebrated Marshals failed; for their jealousy of each other when operating in Spain is well known to the reader of military history.

All such rivalry in this country has been effectually stopped by the appointment of a Minister for War; it can only be from misconception that any opinion to the contrary can possibly be entertained, and it is to remove any such misconception that I raise this question.

The authority of the Minister for War is made perfectly clear from

the evidence of his Grace the late Duke of Newcastle, taken before the Select Committee of the House of Commons in 1860.

Question 2166, page 143. "That department has naturally to com- "bine the direction of the movements of both the Army and the "Navy?—Certainly. I would like to add as an exemplification that "to such an extent is that the case, that the orders for the opera- "tions, both in the Black Sea and in the Baltic, not only nominally "emanated from me, but were actually written with my own hand."

There is no graver error that this nation can possibiy commit than that of placing a vast force of men-of-war in commission, and of calling out a large body of men under arms, without any fixed plans of operations; it is, therefore, imperative that plans of operations should be reflected upon and matured during peace, and the resources of the State for carrying such undertakings into execution well weighed and considered.

It is notorious that both France and Prussia take years to mature enterprises of this nature, and carefully adjust the proper means to the end. No nation, therefore, can encounter them on equal terms if the same deliberate foresight is not shown. In what department of the State can plans of this nature be matured, unless it be in the secret precincts of the War Office, under the presidency of the Minister for War?

It is evident that a new power for the purposes of war has yet to be developed, of which we, comparatively speaking, know little or nothing; the relative value of land and water transit is hardly understood by any military and naval men, and yet millions upon millions may be lost to this country by embarking in enterprises without such knowledge of details.

A march from Varna to the Danube in the late war with Russia would have been one of the most fatal projects in which this country could possibly have embarked, yet to my knowledge it was seriously contemplated.

Possessing every advantage over Russia in carrying on a great war, at a distance from the centre of her own soil, we must clearly perceive how distinctly the line of our operations during the late contest was defined.

The important nature of that great military and naval position, Sebastopol, with its capacious harbour, containing a large fleet, both of men-of-war and transports, its magnificent docks, fine city, and abundance of munitions of war, and the value of the position in every military point of view, marked it as that stronghold most vital to Russia to defend by every effort, and at any cost, and consequently to be at once selected as the immediate object of our attack.

The selection of such object of attack must inevitably draw to the south all the vast armies of Russia, thus denuding the northern ports of the men necessary for their defence, and subjecting their army to those heavy losses consequent on such lengthened marches. Constantinople or Scutari, on the other hand, offered us a most favourable position *as the real basis of all our operations;* it was there that we could collect in perfect security all the necessary stores for the most exten-

sive undertakings, and the short distance that intervened between it and the Crimea,—especially as the communication could be kept open during any season of the year, through the agency of a steam transport fleet,—gave us in effect a position as valuable as one on the enemy's territory, but free from all its dangers.

It was essential to the success of so great an operation that all simultaneous efforts against any other portion of the enemy's territory should have been made subservient to this most important object, as it was impossible for this nation, *drifting* into war with little more than a peace establishment, to press to a successful issue more than one such undertaking, for we had neither men nor means at our disposal for any serious attack in the Baltic; we stood in want of every kind of material that could secure success to our operations—men, mortars, shells, gun and mortar vessels, and even powder!

The fleet despatched to the Baltic in the spring of 1854 ought to have been regarded as a *mere* blockading force, not to engage in any operations unless the enemy appeared at sea, but nevertheless, by threatening every portion of the Gulf of Finland, to paralyze the movements of the troops, and to detain them in a state of inactivity in the northern portion of the Empire until the winter had set in, and the Allied Army had secured a firm footing in the Crimea.

I would again ask how operations of this nature are to be conducted if the Minister for War has not made himself, during the time of peace, intimately acquainted with the resources of the State, and has conceded to him the entire control over both branches of the public service in time of war?

Unity of action, so necessary in time of war, can never be obtained by divided authority; the able manner in which Von Moltke directed the two great armies of Prussia in the late campaign against Austria, is demonstrative of the value of power being concentrated in the hands of one individual; divided authority has been, and ever will be, ruinous to a State.

Mr. Cardwell has stated, in his place in Parliament, that he is not only organizing a more complete system of defence for these shores, but that he is preparing an army for effective operations abroad, and that he contemplates to provide a reserve of about 60,000 or 70,000 men in addition to our regular Army, concentrated, or to be concentrated, in England. This is the first time that so complete a measure has been matured during peace, and the exigencies of the public service thus early provided for.

It behoves us, therefore, to consider how the services of such a force can be most effectually utilised, and I can conceive no measure of greater importance than the organization of a more efficient naval steam transport fleet for army purposes.

I have pointed out in a previous portion of this paper the great difficulty that an enemy would have in effecting a landing in this country, but I will suppose, however, that difficulty to be surmounted, so far as all opposition from the Navy is concerned.

Let us only reflect upon the time it would require to land 120,000 men, 100,000 animals, and munitions of war on these shores, let us

measure the capabilities of others by the time we took to perform an operation of a like nature in the Crimea, unopposed and with the water as smooth as glass.* Let Admiral Mends tell his own tale as it was told by him in his paper read before this Institution in November, 1862.†

"By 6 P.M. 30,000 infantry and 24 guns, or four complete batteries, "were landed, but sunset came upon us with a lowering sky, and a "threatening swell breaking on the beach, a sure indication of ap- "proaching wind, rendering the disembarkation of artillery more and "more tedious and difficult. At nightfall the weather was so bad, "and sea heavy, that the operation had to be suspended. The troops "had landed with three days' provisions in their haversacks, but with- "out tents or equipage of any kind. Thus was that gallant Army "exposed for two days and nights on a hostile shore, with no water "except what fell from the heavens, not half its artillery, no shelter, "and in the vicinity of a powerful enemy."

Now, as this operation commenced at 7 A.M., we have the fact that in dead smooth water it took eleven hours to land this small force with their guns. With this country, intersected with railways in every direction, and possessing the most perfect means of internal communication, what would our regular Army, Militia, or Volunteers be doing all this time? The power of this great nation depends upon its limited area exposed to the attack of an enemy, the density of its population, and the rapidity with which communication can be accomplished in every possible direction.

Many are not aware of the great addition which has been made to the defensive powers of this country since the Crimean war; they are not acquainted with the fact that a most perfect system of rapid transit has been organized by the War Office in conjunction with railway directors and civil engineers, by which the entire forces in Great Britain, Regulars, Militia, and Volunteers, cavalry, and guns, aided by an attendant army of skilled navvies, competent to throw up any amount of earth works, can be brought to oppose an invading enemy on any part of the coast in an incredibly short space of time. No invading force that France can spare, or is ever likely to be able to spare, would have a chance with this nation in the field, now so well prepared for defence; and the experience we have gained of late of the great use of the spade in military operations, effectually determines the important part to be taken by the navvies of Great Britain in her defence.

It will be seen, if I have reasoned correctly, that a large army cannot be landed safely in an enemy's country, if that enemy has the power of concentrating its forces quickly, but that a small flying army of 10,000 or 15,000 men, well provided with the means of effecting a landing, acting along an *extended coast line*, would paralyze the resources of a great military power, and destroy its means of utilising its army. Moreover, it would enable this country, on the immediate out-

* The numbers of men and animals here given are those estimated by Captain Tulloch, in an able paper, "On the Protection of London against an invading force "landing on the East Coast," read by him in this Institution, on Monday evening, May 23rd, 1870.—J. C. H.

† See Journal, vol. vi, p. 391, *et seq.*

break of war, to seize upon certain strong military positions which it is not necessary for my argument to mention in this paper. Any large body of troops held in reserve in this country for active service abroad, would, I conceive, rarely be despatched from these shores, but when acting as allies, and to a friendly country, where, by the combined action of our naval and mercantile steam fleet, any amount of troops from England and India could be rapidly concentrated on any given point.

But it is of paramount importance that our coaling establishments in many portions of the globe should be placed on a more efficient footing; it is useless to concentrate our Army in England, and to organize a large force for active service abroad, unless those great military positions shown on the chart are better supplied with fuel than they have heretofore been, and the whole system for expediting the work more efficiently organized.

In all previous expeditions, such as the Crimean war, the Indian mutiny, both China wars, and lastly the Abyssinian war, no adequate supply of fuel was to be found at our several great military stations *en rout*. Again, a *false system of economy during peace was to be paid for by an exorbitant outlay in war*. Again, the resources of the greatest military nation in the world were to be paralyzed, and the authorities driven to employ, as in the Abyssinian war, 205 sailing vessels in navigating a sea from which it ought to have been foreseen that they could never emerge until the change of the monsoon. (See Appendix.)

There is no use in our closing our eyes to the facts of the case; as naval men we clearly understand the cause of all this want of efficiency. The transport branch of the Navy has never been held in any estimation; it has never been patronized nor cared for; it has been deemed a mere offshoot of the Navy. The regular service, as it has been called, has monopolized all the outlay and honorary distinctions, and thus the best interests of the nation have been deliberately sacrificed. But it is not with individuals, but with the system I find fault. Mr. Cardwell is rapidly changing a similar condition of things that equally prevailed in the Army, and is developing the resources of our army transport department. It rests with Mr. Childers to unite with Mr. Cardwell in investigating the present condition of our naval transport steam fleet, and in placing our *great coaling depôts abroad* on a more efficient footing.

*Plan for rendering the Over-Sea Transport for Army Purposes more efficient, and for bringing it more under the Control of the Minister for War.**

In the organization of the Control Department, one of the principal duties, as stated in Lord Strathnairn's Report, is to place upon an efficient footing the transport of the Army, with a view to facilitate the supply of every kind of munition of war to an army in the field. Under these conditions it must be most apparent that, owing to our insular position, it is essentially necessary to consider the nature of

* This plan was drawn up about two years ago, and sent to Major-General The Right Honourable Sir Henry Storks.—J. C. H.

the control to be exercised over the sea transport, for it is evident that unless those entire duties and responsibilities are confined to the defence only of this kingdom, the most perfect organization for operations on shore may be paralyzed and rendered completely nugatory before an army can take the field in an enemy's country.

The difficulties, however, in this respect have been greatly modified since the commencement of the Crimean war, by the appointment of an especial Minister of State to act during peace, as head of the War Department, and whose undivided efforts may be supposed to be directed to the placing on an efficient footing the military resources of the kingdom.

I believe I am correct in stating, that whenever a General embarks for active service, the Transport Fleet, being the base of his operations, is under his sole and undivided control, and that the naval officers who may be more directly in charge of the transports, cannot withdraw any portion of them or direct them on any other service without consent of the General in command of the expedition.* In the press of business, or in consequence of the military Commander-in-Chief being absent from the port of debarkation, his authority may be delegated, under certain limitation, to a naval officer more directly in charge, who is supposed to act in full concurrence with his wishes; but both in theory and in fact, the control of the General-in-Chief is admitted to be complete over the transports which the Government has selected to form part of the expedition or sea-base of his operations.

When such an expeditionary force is despatched, it is usual to place it, for protection, under convoy of a naval force, which may be commanded by an Admiral or other junior officer, who is directed to co-operate with the General and aid and facilitate his operations in every way in his power, but they are never to be considered as co-equal powers, so far as to limit the General in his choice of the point of debarkation, or to control his means of re-embarkation at any moment when he may be desirous to evacuate the enemy's country.

With the French, the power of the General in command of the forces is more absolute, for the Admiral acting with the Army is, so far as concerns any power of independent action, entirely under the control of the General Commanding-in-Chief, as was proved in many instances during the Crimean war.

Without in any way proposing to disturb the system that has been in practice in our service, with the object of obtaining greater unity of action, I would only direct attention to those changes which I conceive to be the natural consequences of the appointment of a Cabinet Minister to preside over the organization of the Army, and whose special duty must lead him, during peace, to place in as high a degree of efficiency as possible that military branch which he immediately controls.

* Since writing the above, I have learnt that the Duke of Wellington in the Peninsula had full control over the Transport Fleet:—and Sir Stafford Northcote required it to be inserted in Captain Tryon's instructions that he should be subject to the general control of the Commander-in-Chief of the Abyssinian Expedition.—See Appendix.

Now it is utterly impossible for any Minister to perform these functions unless the financial means to enable him to introduce the necessary reforms are placed entirely under his direction; it is surely a false position for the Minister of War to be placed in, that the means for perfecting the sea base of his operations should be withheld from him. Experience has taught us, that no department will willingly incur any expenditure for another branch of the public service, if the same serves to swell their own estimates, especially during peace, when public attention is immediately directed to any increase in those estimates; though it is evident that a great amount of efficiency and vast economy may be effected in the general expenditure of a nation when extended over a series of years, if such matters be only maturely weighed and considered during peace.

When we reflect how essentially scientific every branch of the War Department is becoming, and what vast diversity of talent is required to mature and bring to perfection every operation in war, it appears to be most important, considering our insular position, and the powerful auxiliary aid we derive from the agency of steam, that a naval branch, intimately acquainted both theoretically and practically with that important science, should form an integral part of the new organization of the War Office, so that the Minister charged with perfecting our military resources during peace, and directing their operations during war, should have within his own office the means of immediately ascertaining any amount of nautical information, together with a knowledge of all the latest mechanical improvements for the utilization of steam to the purposes of war. The nucleus of such a naval staff fully qualified to deal with these questions, and capable of rapid expansion at the first outbreak of war, would greatly add to the general efficiency of the War Department, especially as under the new organization it can be maintained as a useful component part of the military establishment of the Army, as well during peace as during war.

The various duties of so important a staff are most obvious and palpable. The members which should be attached to the War Office itself, need not, even on the declaration of war, exceed three in number, viz., a Naval Intendant, with the rank of a Captain in the Navy, an officer of the rank of Master in the Navy, and a Chief Naval Engineer. This proposition is similar to that submitted to Lord Strathnairn's Committee by Sir Charles Trevelyan, as a measure of great national importance; but this proposal, if adopted, will prove more scientific and mechanical in its nature, and consequently more generally useful. Sir John Pakington, in his speech introducing the Army Estimates, states, "It has been the practice of many years—I confess the propriety of the practice is open to a great deal of doubt—to charge upon the Army account certain stores for the Navy; and, on the other hand, some charges which properly belong to the Army are charged upon the Navy Estimates. The account of the War Office for naval matters is £418,000, and the account for the transport of the Army provided for in the Navy Estimates is £424,791: I think the sums for each service ought to be charged to that service; it has been a long controverted question, and the practice seems to be open to very serious objec-

tion. I have had to move the Navy as well as the Army Estimates, and I have been struck with the inconvenience of the practice on both sides."

Every Commissary-General in the Army has expressed a similar opinion, and has pointed out the ruinous practical results during war which flow from such a system. It appears, however, that no great radical changes are necessary to give the Minister for War all the control he requires. The Transport Department is a separate branch of the Navy, and a Civil Department, although presided over by a naval Officer; there can be therefore no possible difficulty in transferring the entire control over the Military Estimates for the sea-army-transport, to the Minister for War, he notifying through his Naval Intendant's office under the Control Department the nature and amount of hired transport which he may require. The accounts are kept separate now, and will be kept separate then, but the necessary authority for the outlay will go direct from the War Office, instead of through the Admiralty, which will greatly expedite the business in every respect.

No tenders for army transport ought to go out, or be accepted by the Transport Board, without being first seen and examined by the Naval Intendant on the part of the War Office, and such modifications and suggestions introduced as he shall deem necessary for the greater efficiency of the service. There is no possible doubt but that the hire of steam transports for army requirements is a most important question embracing an enormous outlay; and it is notorious that very inefficient vessels have at times been selected and dispatched on distant service without any correct investigation into the steaming and other qualities of the vessels, or the introduction of certain conditions in the terms of contract, which would have greatly tended to the benefit of the service and the comfort of the troops.

But there is a scarcely less important field for improvement in the organization of a complete system of inland navigation for rivers for Army purposes, which the establishment of such a Naval Department at the War Office would readily effect. The entire want of all such arrangements is a serious source of complaint by the most experienced Commissariat Officers, as they find that they cannot command sufficient unity of action with the Navy, Naval Officers, it appears, declining to be made responsible by signing vouchers when transferring military stores across a river. An important link in the line of communication between the base of operations and the head-quarters of the General is thus broken, and confusion introduced, where the highest order should exist.

There is no doubt that a great blot in our army arrangements is the want of an efficient corps to meet these several pressing necessities, which from our insular position must be at all times needed. The naval branch would start as pioneers in advance of the main body of the expedition, thoroughly conversant with the art of constructing wharves, jetties, and storehouses, laying down tramways, the putting together and the working of steam cranes, river boats, and iron lighters, and of handling them when constructed. This force would aid in the discharge

and landing of cargoes; in fact, meet any and every necessity required by the head of the Control Department at the port of debarkation or in the field.

That which would make the establishment of such a corps so exceedingly valuable, would be its highly scientific nature and general utility, for it ought to comprise within itself every grade of profession, so as to render it capable of undertaking any mechanical operation whatever. Such a corps of men and officers, if properly selected, would be second to none in general utility, and would have a clear and distinct field of action from the very nature of its composition. If time is money in mercantile operations, how infinitely more truly this may be said of any military operations. That powerful agent, steam, simplifies, expedites, and enormously economizes our military resources; but as yet we have hardly reflected upon its nearly universal application, much less have attempted to avail ourselves of its services. Another important feature in the formation of such a corps is its capability of rapid expansion; the nucleus of such a force is only required in time of peace, which would find ample employment in the Store and Lighter Department, which I observe is to be established by the War Office on the banks of the Thames.

The statistical abstract for 1867 states that the mercantile steam marine (exclusive of river steamers) has increased from 538 vessels of 212,637 tons burthen, and manned by 15,894 men, in 1854, to 1,616 vessels, of 812,677 tons burthen, and manned by 43,111 men, in 1867. This is the school from which the Control Department could draw a large portion of its volunteers; none better or more experienced can be found; and it is well worthy of consideration that these would join the corps as experienced men, having but little else to learn than how to combine their action, together with a certain amount of military knowledge.

The economy which such a corps would introduce into the army expenditure when on active service it is impossible to estimate. Our large hired steamers are maintained, even in port, at a charge of from £200 to £300 per day each; therefore every hour that they are unnecessarily detained after arrival at their destination, from lack of storehouses, or of wharves, jetties, steam cranes, lighters, and steam launches, to facilitate the rapid discharge of their valuable cargoes, enormously enhances the cost of the expedition, whilst it tends to great destruction, as well as detention of the cargoes themselves, and to a fearful sacrifice of time, even when, as in the case of the late Abyssinian expedition, time is so necessary an element of success. Moreover, no great outlay will be required to enable this corps to attain a wonderful degree of perfection. Models of storehouses, lighters, and steam launches, jetties, wharves, &c., &c., have only to be determined upon, and plans and specifications proposed, in readiness to be issued to well-known firms on the first outbreak of war,—organized, in fact, in the same manner as the Carriage Department at Woolwich. Such matured arrangments would answer every emergency of the public service, as the financial and mechanical resources of this country are so great, that for operations of this nature, though giving life and utility to

entire armies, hours alone are needed from the issuing of the contracts to the time of their completion. It is, however, absolutely essential that no discussion, as to the nature of the work to be required, shall take place after the war be determined on, but that all shall have been previously considered and arranged.

The value and importance of such a corps has lately been admirably exemplified by Mr. Charles Hutton Gregory, in his inaugural address as President of the Institution of Civil Engineers, which I cannot do better than simply transcribe. Speaking of the late civil war in America, he states that "at an early period a number of workmen under com- "petent engineers and foremen were formed into a Construction "Corps. This corps became at last very experienced in the work "of repairing damage. The Rappahannock River Bridge, 625 feet "long and 35 feet high, was rebuilt in 19 working hours; the Potomac "Creek Bridge, 414 feet long and 82 feet high, was built in 40 working "hours; Chatterhoochee Bridge, 780 feet long and 92 feet high, was "completed in 4½ days; between Tunnel Hill and Resaca, 25 miles of "permanent way and 230 feet of bridges were reconstructed in 7½ days; "and near Big Shanty 35½ miles of permanent way and 455 feet of "bridges in 13 days. The last of these remarkable operations took "place on the line by which General Sherman was connected with his "base in his advance from Chattanooga to Atlanta; and that the Mili- "tary Railway Department, almost entirely through a hostile country, "should have kept pace with the march of General Sherman, con- "structing and reconstructing the road in his rear, and ultimately "have maintained the supplies of an army of 100,000 men and 60,000 "animals, from a base 360 miles distant, along a single line exposed "at all times to the attacks of an active and resolute enemy, is indeed "a wonderful example of forethought, energy, patience, and watch- "fulness."

It cannot fail to be a source of astonishment to observe the want of foresight which this country has at all times displayed in neglecting to organize a corps of a similar nature, especially when we reflect that from our insular position we are far more dependent on such adventitious aid than any other nation.

Hitherto, whatever country may have been the scene of our military operations, we have always lacked sufficient means for facilitating the disembarkation of men, stores, and munitions of war; thus at all times greatly retarding our operations, and in many instances, as in the late Abyssinian war, imperilling our chance of success. Yet no nation in the world possesses such abundant wealth and mechanical resources, or greater talent, natural and acquired, for the perfection of such subsidiary aid, which would be found fully to double the military strength of the country, while the expenditure would be reduced to a minimum from the enormous economy effected by the saving of both time and labour; the invariable consequence of all well-matured plans of military organization.

APPENDIX.

"H.M. Steamer, 'Inflexible,' Bombay,
"*July 20th*, 1848.

"Sir,

"I must not conclude these observations without expressing a sincere regret that I cannot fail to observe the slow advancement the "principles I have laboured to inculcate have made, or are likely to "make. Should a war break out within a few years, the enormous "expense our steam marine will cause, will be felt to a degree of which "parties who have not reflected upon the subject, cannot form a distant "conception. The price of coal will instantly rise to a great height "in consequence of the increase of freight, insurance, and demurrage. "A steamer to act effectively must be constantly under steam. Even "at New Zealand this was the case in such petty warfare, and not a "ton of coal on that station ever cost less than 2*l.* 10*s.* a ton, and from "its inferior condition, we burnt 25 per cent. more, to perform an equal "duty, than would be required in England.

"The efficiency of steamers in these seas is, without any comparison, "greater than in any other part of the world, in consequence of the "prevalence of the monsoons and the currents they bring with them. "Let me take a strong case in point to illustrate my argument. "Commodore Plumridge, at Penang, gave me strict orders to economize "fuel to the greatest extent, and to consider sails as the rule, and "steam as the exception, yet I was unable to place my steamer under "sail for even a single hour, the wind being either light, variable, or "contrary.

"Under a small portion of steam, worked expansively, we reached "Trincomalee in seven days, deeply laden, and then having filled up "with provisions for myself, a large quantity of stores for the "'Cambrian' and 'Vernon,' and anchors for the 'Cruizer,' we arrived "at Bombay in nine days, steaming against the monsoon, as the "abstract will show, about 7 knots an hour upon two boilers. This "voyage then, which was performed in sixteen days under a moderate "portion of steam (and so moderate a quantity as people will hardly "credit here who have not had my abstract to peruse), could not have "been effected by me under sail in less than nine or ten weeks. There "is one portion of this voyage running along the Malabar coast, which "we on two boilers effected in four days, that Horsburgh states, in "a more favourable month of the year, took him thirty days, the "current being strong, and the wind light, variable, or contrary.

"(Signed) J. C. HOSEASON,
"*Commander and Senior Officer, Bombay.*

"Hy. G. Ward, Esq.,
"*Secretary of the Admiralty.*"

EXTRACTS FROM MY "REMARKS ON THE RUSSIAN WAR."

(*Published in* 1857.)

"But what will be said for our want of foresight, when it is known "that war was declared without our having stored at Gibraltar, Malta, "and Constantinople such adequate supply of fuel as would have "enabled us to develop the maritime resources of the country?

"I have good reason to believe that, if a Parliamentary return of "the numbers of tons of fuel in the Government stores at Malta, just "previous to the declaration of war, were moved for, the whole "amount would have proved to have been very insignificant; and "thus the right arm of England, her steam marine, was paralyzed, "and the rate of freight enormously enhanced for the transport of men "and munitions of war, by the demand concurrently made on the "shipping world for the transport of fuel. Had 60,000 or 80,000 tons "of fuel been quietly and secretly stored at each of the above-named "places—had contractors been directed to construct jetties and "wharves, with cranes worked by steam, and other requisites for the "orderly coaling of a vast steam fleet, how steadily and rapidly would "our troops and stores have been conveyed to the seat of war, and the "confusion, expense, and misery at Constantinople and Balaclava, "been prevented.

"If the formation of large depôts of coal that would have given life "to a steam-transport fleet was our first duty; if the early establish-"ment of an efficient Transport Department was the second; there "were other duties hardly less important; as the construction of coal "wharves; the furnishing of a large supply of coal and provision "lighters; the organization of an efficient fleet of steam-tugs, and "steam water-tanks, at or near Constantinople, to meet the various "wants of so vast a fleet.

"Let anybody but carefully peruse the important evidence taken "before Mr. Roebuck's Committee of Enquiry, and they will find "sufficiently established there, on official authority, the omissions of "which we were guilty.

"It is in those pages satisfactorily proved that we had no efficient "coaling-wharves or well-organized coaling establishments, consisting "of lighters and steam-tugs; steam transports which were costing the "country 200*l.* a day for freight, were from the imperfection of the "coaling arrangements detained twenty-four hours in getting 30 tons "of fuel on board; when it is notorious to officers accustomed to com-"mand steamers that 40 tons an hour may readily be put on board "from well-organized coal depôts; with our vast private steamship "building establishments in Great Britain, all most desirous to serve "the country whenever called upon, there was positively not one "Government steam water-tank at Constantinople to meet the require-"ments of the largest steam and sailing fleet ever dispatched from our "shores.

"With a Parliamentary return of more than 1,100 steamers of all "sizes and dimensions, the country will hardly credit the fact that we "neglected to dispatch suitable vessels to the mouth of the Dardanelles "to tow up the wind-bound colliers and sailing transports the distance "of 150 miles to Constantinople.

"It was not from the miserable resources of Malta and Constan- "tinople that these great demands for war could have been supplied, "but it was from England, abounding in ready-constructed steamers "of all sizes and dimensions, and with her innumerable private "firms of unquestionable talent, mechanical genius, and material re- "sources."

EXTRACTS FROM MY REMARKS ON THE TRANSPORT OF TROOPS TO INDIA.

(*Published in* 1858.)

"In a late debate in Parliament on the conveyance of troops to India, "the First Lord of the Admiralty, Sir Charles Wood, is reported to "have said, in reply to Admiral Sir Charles Napier, 'that he could not "'have been expected to keep in the Government depôts sufficient "'coal to meet any emergency like the present, and that all the Admi- "'ralty could be expected to do was to provide fuel for ordinary occa- "'sions.' It is, however, demonstrative that such views must be "erroneous, and they can never be entertained without resulting in "the greatest possible injury to the public service; for to what purpose "has this country entailed upon itself such a heavy public expenditure "during peace, if all is to be rendered nugatory at the first outbreak "of war, from the impossibility of putting into immediate motion our "vast naval and mercantile steam-fleets? The Parliamentary abstract, "from the year 1842 to 1856 inclusive, informs us that no less a sum "than £133,000,000 have been voted to perfect our naval service, "whilst a sum of from £800,000 to £1,000,000 annually has been "granted during the same period, in subsidies, to establish in an effi- "cient manner our great mercantile steam lines. But what imme- "diate advantages did this country derive from such vast outlay "in the late war with Russia? And what are we now likely to benefit "from it in expediting our operations in India and China? With a "Parliamentary list of 1,600 steamers of all sizes and horse-power, we "were made painfully sensible of the fact that we were obliged, in "the late war with Russia, to dispatch the *élite* of our cavalry and "artillery by sailing vessels to Constantinople, and that the first 42 "of these ships took 34 days to reach Malta, a distance of only "2,132 miles from England, and during that tedious voyage a large "portion of the cavalry and artillery horses were rendered ineffective; "whilst, at a later period, an entire regiment of cavalry, 400 strong, "was conveyed in twelve days by steam from England to Varna, a "distance of 3,300 miles, without the loss of an animal, or with even "distress to the horses. That there was no lack of steamers for this

"service, all those acquainted with the facts of the case must be fully "aware; but it was useless to engage them, there not being coal suffi- "cient in the depôts on the route. Endless discussions have been raised "as to the proper position in the vessel in which the horses should be "placed, when it ought to have been known that speed through the "water imparts steadiness to a vessel, and consequent ease and com- "fort to the animals."

MEMORANDUM BY THE DIRECTOR OF TRANSPORT SERVICES, REAR-ADMIRAL W. R. MENDS, C.B.

The following arrangements are proposed with reference to the contemplated expedition to Abyssinia.

It is understood that the force will comprise :—

Infantry, consisting of 3 European and 8 Native regiments.		
Artillery, 4 field batteries.		
Cavalry, Europeans ..	200;	Natives, 1,200; horses, 1,400
Mountain Train ..	200	
Engineers	200	
Mules..	10,000	
Camels	5,000	

Being a total of 12,000 (combatants), 1,400 horses, 10,000 mules with 2,000 muleteers, 5,000 camels with 7,500 drivers.

Provisions, medical comforts, and forage for the above for three months.

TONNAGE REQUIRED TO CONVEY THE EXPEDITION.

	Tons.
12,000 men, at 2½ tons per man	30,800
1,400 horses, at 6 tons per horse	8,000
10,000 mules, with 2,000 muleteers, at 4½ tons per mule with muleteer ..	45,000
5,000 camels, with 7,500 drivers, at 8½ tons per camel and driver ..	41,250
Total tonnage required for men and animals	120,050
In round numbers, say, supposing that the whole expedition is afloat at one time	125,000
Also three hospitals ships of 2,000 tons each, if procurable	6,000
Total tonnage	131,000

NOTE.—See Major-General G. T. Jameson's estimate, Appendix No. 5, p. 153, Report of Committee on Abyssinian Expenditure.

INDIA OFFICE,

Sir, *29th November*, 1867.

I am directed by the Secretary of State for India in Council, to acknowledge the receipt of your letter of the 25th instant, and to acquaint you in reply that, subject to the concurrence of the Govern-

ment of Bombay, he approves of the instructions addressed to the Naval Commander-in-Chief at Bombay, respecting the duties of Captain Tryon as Agent of Transports in connection with the Abyssinian Expedition.

2. I am to suggest, however, that the 3rd paragraph of the instructions to Captain Tryon should run thus:—The duties of Captain Tryon will comprehend the entire organization and charge of the whole of the transports afloat, subject to the general control of the Government of Bombay, or the Commander-in-Chief of the Abyssinian Expedition.

3. A copy of this correspondence will be forwarded for the information of the Government of Bombay.

I have, &c.,
(Signed) L. L. PEARS,
Major-General.

To the
SECRETARY OF THE ADMIRALTY.

Admiral RYDER: A suggestion has been made to me which I think well worth carrying out, it is that the discussion be adjourned. The subject is a very important one, and many questions of great interest have been raised. I therefore beg to move the adjournment of the debate to such day as the Council may appoint.

Admiral HALSTED: I beg to second the motion.

The CHAIRMAN: Considering the importance of the subject, I think the motion for adjournment deserves to be carried into effect. There are some statements of Captain Hoseason which many gentlemen present wish to consider. I have no doubt you will all agree with me that Captain Hoseason has brought forward a very important subject in a very masterly manner. In doing so, he has no doubt been animated by the desire to be useful to the country; and he himself, perhaps, more than anybody else, courts the utmost publicity and discussion. Therefore, I believe he will rejoice in the proposal that this meeting be now adjourned.

Captain HOSEASON: If it is not out of order, I should like to say a word. So perfectly am I in accord with the motion for an adjournment, that I feel no justice can be done me until this paper has been printed for discussion, and for this simple reason that I have only given you a *vivâ voce* sketch of what is in these pages. When I was asked to lecture here, I at first declined to do so; I felt that I could not throw into an hour the result of the labour of thirty years of my life. I have not now given you new matter, but have simply referred to data that I have had before me. My friend Admiral Ryder, in moving for an adjournment, has done me great service. If therefore you adjourn the meeting, and you allow me to print my paper, and give people an opportunity of reading it, you will do me the greatest justice.

The meeting was then adjourned, subject to the decision of the Council, to Monday evening, June 20th.

Monday Evening, June 20th, 1870.

VICE-ADMIRAL COLLINSON, C.B., in the Chair.

ADJOURNED DISCUSSION.

The CHAIRMAN: In accordance with what is customary on these occasions, the gentleman who moves the adjournment has the priority of speaking. I therefore call upon Admiral Ryder to communicate any observations he has to make on the subject before the meeting.

Admiral RYDER: The question before us to-night is a paper which was read by Captain Hoseason on the "Transport Service." I should like first to consider several statements in the paper with which I entirely agree. I shall make a few observations upon them, and then I shall pass on to the statements which I cannot agree with.

The first statement is that contained in the heading, viz., that there is "*a necessity "for an increase in our naval steam-transport for military purposes.*" I hold this to be a truism—at all events in this room, among naval and military officers generally. The experiment of purchasing the "Himalaya" has satisfactorily proved what had often been asserted before, that the Government can, under ordinary circumstances, move its troops in its own transports much more promptly at a much cheaper rate than in hired vessels, and with much greater comfort to the troops. The five large troop-ships of the "Serapis" class are, I am informed, admirably adapted in every way for conveying the reliefs to India. Circumstances connected with the proposed depth of the Suez Canal and the harbours which they would have to enter, probably ruled their draught of water, and made their peculiar dimensions unavoidable. The propensity to roll deeply, resulting from these dimensions, has been corrected in one instance, and may be in all, by bilge-pieces. I have heard from Officers who have been in them, that their roll without those bilge-pieces is excessive. If several similar vessels are added to our transport fleet, there can be no doubt we should be able to carry out Captain Hoseason's views, and dispatch a flying *corps d'armée* to a considerable distance with a promptitude which might decide the fate of a campaign.

There are three questions which may have to be considered in looking into this matter. (1.) The Government, looking at the proposal as politicians, may deem it objectionable to largely increase our transport fleet, under the impression that by so doing the European jealousy of England's power, now sleeping, might be again awakened; but this is a question with which, in this Institution, we have nothing to do. (2.) There is another point about which also I think we need not trouble ourselves here; but I may as well allude to it. There is probably an impression upon the part of the Government, that it is as well to rely to a great extent upon the large and influential ship-owning class for aid in case of war, and for this reason, because a naval war undoubtedly tells very much against the interest of shipowners, and it may be well to enlist their sympathies on the side of Government when there is a naval war, by calling upon them for a supply of transports. But that is a question we need not dwell upon here. (3.) Another point is, that as we have lately reduced our military forces very considerably in the colonies, it may be thought that it is not so necessary now as heretofore to largely increase the number of these large transports; but that also is not a question which we need consider here. I therefore throw these considerations on one side, under the impression that in this room it is as well to keep clear of political and economical questions as much as we can. What we have to consider is, whether the proposed changes are calculated to be useful in *case of war.*

Before I pass on to the next point raised by Captain Hoseason, I would draw your attention to the fact that there are models of proposed men-of-war which have been

visited and studied by numerous naval Officers at the Paris Exhibition and at the Kensington Museum. I refer to the models known as Admiral Halsted's models. He contemplates in his vessels carrying a large number of troops, at the same time that they are heavily armoured, fitted with the largest description of turrets, and carrying the largest description of guns: a class of vessel which it will be desirable for our naval constructors to consider when they are designing a fleet for a future war. It appears to me that it would be a very great advantage in war time to be able, when requisite, to carry a large body of troops in our men-of-war.

The next point which Captain Hoseason speaks of, is in pages 3 to 9 of his paper. In alluding, as I have to do, to his paper, I shall always speak of the page and the paragraph, so that those who have the paper in their hands may refer to them. Captain Hoseason speaks in these pages of "*sea transport being preferable to land transport,*" and I imagine there can be no doubt about that. As long as there are no railways through the enemy's country to compete with our sea transport, the latter will generally have the advantage over land transport. It stands to reason it must be so.

At paragraph 3, page 9, there is a statement to the following effect, which I do not like to pass by silently. The statement is as follows:—"*the humiliating position we held during that war* (*Crimean*), &c." This remark is accompanied by statements in the same paragraph, which appear to reflect upon the Royal Navy. These observations might be fully and easily answered, but as it does not appear to be necessarily connected with the subject of the paper I will pass it over for the present.

At pages 10 and 11, and especially in paragraphs 6 and 7, page 11, Captain Hoseason points out that during war, the Secretary of State for War must be supreme. I imagine there can be no doubt about that. If we have a Secretary for War he must be supreme. As the mouth-piece of the Government he conveys the Queen's pleasure. I do not know what has been the practice in previous wars, but I know from reading the evidence of the Duke of Newcastle, that he considered himself to be supreme. When he was Secretary of State for War he issued orders to the First Lord of the Admiralty and to the Commander-in-Chief, which they obeyed. Of course the Secretary of State for War, when there is one, ought to be supreme; there is no doubt about that.

The next question is that of coaling. I concur with all Captain Hoseason says on pages 12 and 13. At paragraph 2, page 13, he says, "*Our coaling establishments in "many portions of the globe should be placed on a more efficient footing.*" Coaling is alluded to in two different parts of the paper. At page 20, quoting from a statement published by himself in 1857, he says, "*Had* 60,000 *or* 80,000 *tons of "fuel been quietly and secretly stored at each of the above-named places, Gibraltar, "Malta, and Constantinople,*" &c. Now I doubt very much if such a quantity of fuel could have been *secretly and quietly* stored, but I entirely concur with Captain Hoseason in the opinion that nothing would more conduce to our success in warlike operations than if, at the commencement of a war, we found that we had large supplies of coal at numerous depôts at and between us and the seat of war. But when we consider this matter carefully with the aim of arriving at a sound practical conclusion we are met with this difficulty, that coal rapidly deteriorates, especially in hot climates, and that the best description of coal deteriorates the quickest. I am informed, on what I have reason to believe is the best existing authority, that, taking the steaming value of coal on leaving England as 100, it is found that, after one year, Welsh coal standing in the "open" has remaining only 75 per cent. of its original steaming value; after two years, only 60; after three years, 50; that is, Welsh coal in the open, after it has left England three years, is then only worth half what it was when it left. Under cover, Welsh coal deteriorates after one year to 85, after two years to 75, after three years to 65; showing the great advantages of coal being covered. North country coal exemplifies what I said just now, that the best description of coal deteriorates most rapidly. After one year, in the open, it stands at 90, after two years at 80, after three years at 75; under cover, after one year, it stands at 95, after two years at 90, after three years at 85. Therefore the deterioration of north country coal, under cover, is only 5 per cent. in one year. Assuming this table to be correct (and careful experiments should be promptly

made to test its truth), we arrive at this fact, that there is a limit to the quantity of coal that we can safely store in our coal depôts abroad. Assuming that we should not wish to have coal deteriorated more than 25 per cent., we should only allow an accumulation of two years' stock of covered Welsh coal and three years' stock of covered north country coal. When I say stock, I refer to the ordinary average peace consumption. If, however, the Government could make arrangements with steam companies whose vessels touch at our depôts to take Government coal at a price suitable to both parties, then the Government, having in view always the contingency of war, might stow in their coal depôts a much larger quantity, as it would be turned over more frequently when there were two demands upon it, viz., their own men-of-war and the merchant steamers that called continually.

There is one other point connected with coaling which I should like to allude to, that is the question which has been raised from time to time about bringing the coal mines of Wales into much more direct and easy communication with Portland. If you look at the map you will see there is no great difficulty to be got over, and we might have coal conveyed to Portland much more rapidly than we do now if proper arrangements were made for coaling facilities.

Captain Hoseason's next suggestion is, that there should be "*a naval pioneer "force for river work entirely under the control of the General.*" It is a suggestion which appears very valuable, and no doubt could be easily carried out without altering in any way our present system of having the transport service generally under the Admiralty.

I have run rapidly through all the points in which I entirely concur with Captain Hoseason, and I now come to what appears to me the most important point, and that is the transfer of the transport department from the Admiralty to the War Office. The title of the paper is "*The Necessity for an Increase in our Naval "Transport Fleet for Military Purposes,*" but the scope of the paper at once passes beyond that; and the second paragraph shows that the writer had a much larger subject in contemplation when he wrote the paper, which, of course, you discover as you read on. It appears to me that if this alteration is made which is suggested in pages 14, 15, 16, 17, 18, 19, it will lead inevitably and very shortly to the further and much more important change, viz., that the naval forces generally will be placed in joint operations under the Military Commander-in-Chief. Of course they are now indirectly under the Minister of State for War; but I refer to placing the Admiral on a distant conjoint expedition under the General, which is not the case now and never has been. We are all familiar with the fact that this is the French system. Admiral Bruat, who went out to the Crimea, was under Marshal Canrobert's orders (and very much Admiral Bruat complained of it when talking to his brother naval Officers of our service), and the practical result was brought home to us when the fleet started for Kertch on the first occasion. It was composed of a French and English fleet with French and English Corps d'Armées; but it was stopped almost within sight of Kertch by orders from Marshal Canrobert, and the combined forces returned to Sebastopol, as Lord Lyons, although not under Lord Raglan's orders, did not deem it expedient to proceed and separate from the French. Thus, by the interference of the French Marshal, a very promising expedition was quashed.

A transfer of the Transport Department will lead inevitably, in my opinion, to the further result of making the Admiral work under the General. If this change is effected, there is no doubt but that any naval Officer who serves under such a system will endeavour to do his duty loyally and zealously to his country under whomsoever he is ordered to serve, however inconsistent the change may be with the traditions of the glorious wars that his predecessors may have been engaged in. But what we have to consider is, whether or not serious inconveniences will arise from making this change, and it behoves those who are in authority to consider carefully what they are about, before they transfer the Transport Department from the Admiralty. I do not believe that there is any intermediate position between those two. If you transfer the Transport Department, the other change will follow as a matter of course.

At pages 14, 15, 16, 17, 18, 19, the heading is, "*Plan for rendering the over-sea Transport for Army purposes more efficient, and bringing it more under the control of*

the Minister of War." The present system, I dare say, is familiar to nearly everybody in this room. A Transport Department has been created. An experienced naval Officer, Rear-Admiral Mends, has been selected for its head on account of his special qualifications. He acts under the Admiralty, but if the War Office wish it, he has daily, and if necessary, hourly, free, semi-official communication with them, followed up by immediate action. I have studied very carefully the evidence given in 1861 by Officers of all classes, and of high rank in the *Army*, and it is evidently their opinion that that is the *very best* system that can be invented for carrying on the duties of the two services both in peace and in war.

In the first paragraph of the paper the writer states that the subject is of "*vast importance*," *as it involves the question not only of "the necessity for increasing our naval transport fleet for military purposes, but also the question who is to have charge of the funds for such purposes, as well as who is to exercise the supreme authority* both at home and *abroad*, when any *combined operations are conducted on the coast of an enemy*." I was not quite sure, and I am going to ask Captain Hoseason now whether by that he means the supreme authority over the transport, or the supreme authority in *conducting the war?*

Captain HOSEASON: The *war* unquestionably, consequently the general has the transport service under his orders.

Admiral RYDER: That is a most pregnant sentence. I am very glad it is so worded that it points at once to what has probably been already determined upon, and, as I said before, it will lead undoubtedly to the General having the supreme authority over the Admiral in distant operations when there are no means of communicating with the Secretary of War. Take for instance an operation in the Pacific, where there are no telegraphs and no means of communication for weeks with the Secretary of War; in such a case the Admiral will, if the change is made, be under the General. I have looked at the transport instructions dated 14th February, 1808, and can see no trace of the transports being placed under the direct control of the General in the Peninsular Campaign, and although Captain Hoseason states that "Sir Stafford Northcote *required* it to be inserted in Captain Tryon's instructions that he should be subject to the general control of the Commander-in-Chief of the Abyssinian expedition," yet I find on looking at page 23, that Sir S. Northcote only *suggested* that such should be Captain Tyron's instructions, and I have learnt that the suggestion was *not* complied with by the Admiralty. I may be inaccurately informed, but I dare say there are gentlemen here who can correct me if am wrong.

In paragraph 3, page 2 of the paper, we learn by an extract from the Report of Lord Strathnairn's Committee, dated March 23rd, 1867, that this important question of sea transport for Army requirements is reserved, and will be treated separately probably by a Committee composed of military, and *one* naval, Officers. Such a Committee so composed will have to consider many points not raised in this paper before they advocate the change, and among others the following:—

First. That as transports in time of war, when there is a combined operation, carry men, munitions of war, provisions, &c., for the Navy as well as for the Army, and if the forces are nearly equal in numbers, there will probably be no great difference as in the freightage required for each service, the Navy will therefore to a great extent be dependent upon the transport service under the General's orders, or there must be two transport services.

Secondly. That, as in each *merchant ship* transport there has been, and should always be if possible, a naval Officer of the rank of Lieutenant to advise and control the Master; and that as it is highly improbable that our Government transport fleet will ever be so enlarged in time of peace as to make us independent of the aid of large numbers of *merchant ship* transports in time of war, these naval transport agents will be very numerous.

Thirdly. That as merchant ship transports proceeding to the seat of war, not in convoy, and fast steamer transports will frequently be despatched without the convoy of men-of-war—as unfortunately our men-of-war carry too little fuel to keep company for any distance with such merchant transports as the Cunard, and the Peninsular and Oriental vessels—will frequently meet with men-of-war at sea, and at ports when coaling, whose duty it has *hitherto* been to control the said transports, their Captains

and in many cases with great advantage, the naval transport agents themselves embarked in them; (for as a general rule, the transport agents have been officers of the rank of Lieutenant, who from age, or long retirement from the more active duties of the profession, have become inexperienced) and it would be hazardous to remove or diminish this control.

Fourthly. That as the shipowner's pecuniary interest is frequently directly at variance with the interest of the service, seeing that he is generally paid *by the day* for his vessel, it is advisable that all the means and agencies now in force for urging the transports forward be maintained, and that if the transport service ceases to be under the direct control of the Royal Navy, the agency by which this important end is gained will be much diminished in efficiency. It is stated continually in the evidence of distinguished *officers of the Army* in the Report of 1861, that they attach the greatest importance to that fact, viz., "that wherever transports touched, they "constantly found ships of the Navy whose duty it was at once to push them on." I doubt very much if that will continue to be the case, if the transport service is transferred as is proposed. Officers of independent services do not, and cannot interfere with one another.

Fifthly. That if the change proposed is made, there will be at the seat of war, as of course there always should be, a principal agent of transports, probably a naval Officer, and in large expeditions probably an Admiral, with a large number of naval Officers (transport agents) and an immense fleet of transports under his order, in the presence of frequently a much smaller fleet of men-of-war, under the command of another Admiral, but the latter will not for the future—if the first change proposed is made—have the slightest shadow of authority or control over the former, the transport Admiral, and yet that questions must arise every day connected with anchorages, landing, loading, unloading, towing, repairing damages, not to mention enforcing compliance with orders by the Masters, and discipline among the crews, &c., which will require for their efficient solution the most cordial co-operation between the two *independent* Admirals; for the transports, owing to their small crews, depend mainly upon the aid of men-of-war and their ships' companies.

Sixthly. That if there are in the case of large joint operations to be two Admirals at the seat of war, and one of them, the transport Admiral, under the proposed new arrangement to be absolutely under the General, and independent of the Fleet Admiral, then may it not best conduce to success if the Navy Admiral is made junior to the Transport Admiral, and be placed strictly under his orders? These are only a few of the important questions which the Committee referred to will have to consider.

But it will be asked, has this important question never been considered before? It certainly has by the Special Committee on Transport Service which sat and reported on the 26th June, 1861, which report is now on the table, and can be seen by anybody. I will read you the unanimous decision of that Committee in 1861, given with a full knowledge of the events of the Crimean War. "*Your Committee have* "*had very important, but somewhat conflicting evidence in regard to the Minister under* "*whose charge the transport office should be placed, but they are of opinion that this* "*new department should be placed under the sole control of the Lords Commissioners* "*of the Admiralty. The weight of authority is unquestionably in favour of this* "*course, and the reasons given in support of it are, as a whole, unanswerable.*" Can any statement of opinion be stronger? The Committee was a Special Committee of the House of Commons, and consisted of 17 members, including generals, admirals, and colonels. They examined on this point the Duke of Newcastle, once a Secretary of State for War, but only at the commencement of the Crimean Campaign before the Transport Board was created, who advocated the change now proposed, and J. W. Murdoch, Esq., and A. Elwood, Esq., officers of the Emigration Department, who concurred with him, but appeared to have had no special experience in the matter, and admitted the fact as regards warlike operations; also the Duke of Somerset, who emphatically opposed any change. He uses the strongest language. I won't attempt to detain you by reading the questions that were put to him, but I may mention the numbers of the questions, so that any gentleman who wishes to refer to them may do so. Nos. 2790, 2791, 2797, 2798, 2804, 2807, 2808, 2809, 2811, 2847,

2849. I may sum up the Duke's evidence in 2791. "*The change would lead to the "Minister for War being made First Lord of the Admiralty.*" They also examined Sir James Graham, who stands very high, I believe, as an administrative officer, and who had been First Lord of the Admiralty for many years. It is very interesting to read his evidence, because he apparently slightly changed his mind during the course of his examination, but he winds up at question 429 (in the year 1861) by saying, "*All things considered, the Transport Department ought rather to be under the First "Lord of the Admiralty than under the Secretary of State for War.*" Earl Dalhousie, Secretary of State for War from 1855 to 1858, in answer to question 519 says, "*My "view of the conduct of the sea transport is that it should undoubtedly be under the Admiralty.*" Sir Richard Airey, Quartermaster-General at the time, and who served, I believe, throughout the Crimean War, in answer to question 1309 says, "*The "existing arrangements for Sea Transport under the Admiralty control should be "maintained,*" and in answer to question 1320 when pressed, whether he knew in his experience of any inconvenience arising from the present arrangement, after thinking some time he said, "Yes, he did know of *one*, but he never knew of more "than one instance," and he details some small matter of no great account. Then Colonel G. Brownrigg, Deputy Adjutant-General for Ireland, gives very pertinent answers to questions 1390–91–95–99, 1401–02, and considers that the transports must be under the control of the Navy in all matters except the details of embarkation and disembarkation. Colonel Gordon, Deputy Quartermaster-General of the Forces in answer to questions 1816, 1820, "The Transport Department should "be under the direction of the Admiralty;" and 1917, "I think the transport of "the Army should be under the Admiralty, and that the Admiral commanding them "should *co-operate* with the military commanding Officer." All these Officers are Officers of the *Army* thoroughly familiar I presume with the questions at issue. Lieut.-Colonel Clifford, Assistant Quartermaster-General in China is asked how it answered in China, and he says he found no inconvenience from working under the Admiral, and that every facility was promptly afforded. Mr. J. W. Smith, Commissary-General-in-Chief at Constantinople during the Crimean War, and who passed up all those enormous quantities of stores which we know went up in such profusion, was cross-examined by different members of the Committee, and he repeats the same opinion over and over again, that "*All sea transport should be under the "Admiralty.*" He is asked, "Do you mean the Commissariat as well as the troops?" and his answer is, "*Certainly, as to both.*" See questions 37, 58; see, also, 66–67, 70–72, and 100. "The transport services at Constantinople were of immense magni-"tude, and were conducted with an admirable degree of efficiency;" and, 33, "The "system worked under Sir F. Grey as perfectly as any system could." Admiral Craigie, Chairman of the late Transport Board, C. Richards, Esq., Controller of Victualling and Transports, and E. Giffard, Secretary to the late Transport Board, all concurred with the Duke of Somerset in opposing the change. The evidence of these witnesses is well worth reading, but I won't detain you by quoting it any further, unless you wish to hear it. It is sufficient for my purpose that you should have heard the *unanimous* decision of this important Special Committee on a subject, be it remembered, entirely removed from party politics. I have been told that an Officer of the Control Department, whose high position and character entitle everything he says to be carefully weighed (I allude to Sir W. J. T. Power), is of a different opinion, and has given evidence before the Abyssinian Committee on the point. I am not sure whether I am quite in order in this place in alluding to evidence given before the Abyssinian Committee.

The CHAIRMAN: I do not think you are in order, because it is not published yet.

Admiral RYDER: I will not do it then, but I may state that the proposed change has the benefit of having the support of Sir W. J. T. Power, whose evidence will shortly be before the public. I especially wish to draw attention to his evidence. In closing these remarks, I must tender to Captain Hoseason, for myself on my own part, what he will no doubt receive from you, Sir, for all of us collectively, my thanks for drawing my attention to this most important subject, with regard to which I have gained from him much information. I have often learnt from him on other matters

much that was valuable and much that was new to me during the thirty-four years of what has been to me a most instructive friendship. When I first ventured to differ from him on this subject, it was not, seeing how long and how carefully he has studied it, and how ample have been his means of information, without much doubt and diffidence on my part, which, however, were soon dissipated when I had studied for the first time the evidence I have alluded to, viz., that given by distinguished *Military* Officers who had been engaged in the Crimean war, to the Transport Committee of 1861, and which I still hope may have weight with him.

Captain HOSEASON: I have gone through every word of it.

Admiral RYDER: Gentlemen familiar with reports know that in the margin, opposite each clause, references are placed to the questions and answers relied on to justify the clause. Now, in the Report of the Transport Committee of 1861, unless I am very much mistaken, some of the most important evidence, such as Sir Richard Airey's, to which I attach very great weight, is not alluded to in the marginal reference, so that it will escape your notice unless you really read right through the Blue Book. I imagined, but it seems erroneously, that a great deal of this important, and to me most conclusive and unanswerable evidence, must have escaped Captain Hoseason's notice.

Commander MARCH PHILLIPS, R.N.: I only wish to make one remark. I have not had the advantage of reading Captain Hoseason's pamphlet, and, therefore, I am not aware whether or not he bases his arguments upon any proved inefficiency in the combined services on any single occasion; but one matter strikes my mind in connection with what has fallen from Admiral Ryder. It would not be possible, of course, to have the transports navigated by any but seamen, and as they must usually be under the command of naval Officers, I cannot conceive that General Officers would be able to give them orders without that knowledge of naval affairs which few military men could possess. Further, it seems to me that it would be inexpedient to attempt to define distinctions between the positions of the naval Commanding Officer and the military Commanding Officer. By that very definition you would create a difference which has not existed for years past, to any serious extent, in any combined naval and military operations. It had better be left to the sense of duty and good feeling and knowledge of the several Officers. I think it would be a very dangerous matter to define by any regulations of the Admiralty or Government, the exact line of duty between the two Officers combined in any expedition. We know that, in former years, a century or two ago, there were serious disputes, but not in recent years, and I should think it a most dangerous subject to stir at the present moment.

Admiral Sir GEORGE SARTORIUS: Is it meant that the command is to be permanently taken from the Admiralty, or only when there is a combined expedition, which is more of military than of naval importance?

Captain HOSEASON: Only when a combined operation is going on with both the Army and Navy, such as when a great military operation is intended, in which, perhaps, 30,000, 40,000, or 60,000 men may be landed in a country under the direct orders of the Minister of War, and under the command of an experienced General; but if you ask the question I will answer it.

Sir GEORGE SARTORIUS: I wish to ask whether the command is to be entirely taken away from the Admiralty under all circumstances, or only when there is a great and important expedition, and when that expedition is more a military than a naval one. In this latter case I perfectly agree with you, that it ought to be under the General; but with regard to the Transport Service generally, I think it ought to be not so much under the Minister of War as under the General, because the Minister of War is probably at a considerable distance from where the Service is going on, and he cannot be so good a judge as the Admiral or General on the spot, as to the extent to which the command could be interfered with. I think, as a general rule, it is for the good of the Service that the General Officer should have unlimited control over the Troop Transports attached to the expedition, and I am persuaded that the right feeling and good sense of the Admiral would lead him to see this himself, and he would never fail to contribute as much as possible to carry out the object of the expedition, whether he had or had not the complete control over the transports.

Colonel EVELYN: Mr. Chairman, I think the question under discussion is capable of great simplification. The difficulty depends very much upon the anomalous state of our present war departments. Our Secretary of State for War seems to be only a Secretary of State for land war, and to have very little to do with naval war. Properly speaking, he should have the exclusive initiative of all warlike operations. The Admiralty, or Naval Commander-in-Chief, should be under him, and have, I imagine, a precisely similar position to the Commander-in-Chief of the land forces, and the War Office should not have more exclusive control over the Army than over the Navy. There should be precisely similar control over both. Then, I think, the gallant Admiral who spoke last hit the nail on the head when he said it should depend very much upon the nature of the combined expedition—whether the supreme control should be in the hands of the naval Commander or of the military Commander. For instance, in the case of the Crimea, it is quite certain that the naval operations were subordinate to the land, and that the sea transport service should have been as much under the control of the Commander of the land forces as the land transport was. But there are many other expeditions, such as a number of troops being placed on board ships to ravage an enemy's coast, or to carry on desultory operations to injure the enemy in various parts—a kind of roving commission. In such cases, the troops should be as much under the control of the naval Officers as the marines. It appears to me, then, that it is a question that can hardly be settled whether the control shall be under the naval or the military Officer. It must depend almost entirely on the nature of the expedition.

Sir GEORGE SARTORIUS: I am sorry I was not here when Captain Hoseason read his paper, for there are many points upon which I quite agree with him, but the time is too limited now for me to enter into details. With regard to the Transport Service being put upon an efficient footing in time of peace, while possessing the expansive power of increasing itself for use in time of war, there is no doubt the insular and unassailable position of our country suggests the advisability that as we have entire command of the sea, we should be able to increase the power and influence of the country by making fruitful for military purposes so invaluable an advantage. A well regulated Transport Service, and efficient vessels backed by our war vessels, would confer the power of ubiquity upon our troops, and that without fatigue or risk, thus keeping upon the alert thousands to our hundreds, and while acting as allies, 10,000 men with such means and under those circumstances, would be far more important than 20,000 or 30,000 without them. In this way, and with 50,000 men ready for embarkation, the influence of our country would act as a most powerful police to preserve the peace of Europe, and to protect our vast possessions all over the world. Having these views, I cannot help thinking that to carry them out efficiently, one of the most useful means would be, a mixed commission attached to the War Office, strictly consisting of Officers of experience selected from the Navy, and the three Army Services, under whom that portion of the Transport Service which is mainly intended for military purposes should be exclusively placed, subject of course to the supreme control of the Minister of War. The construction of the transport ships should be under the Admiralty, as well as the officering and manning, but all the details of internal fittings, arrangements, and the employment of the vessels, should emanate *viâ* the mixed commission and the War Office. When we reflect on the still continued state of transition of the war Navies of the world; on the vast development of artillery and small arms in all their most important qualities; the introduction of armour-clad vessels; the ram projectile, the torpedo, and the unlimited power of steam for war purposes, we must feel how profoundly all these inventions have changed, *de fond en comble*, the theory and practice of naval warfare, but also that of military combined operations, particularly those relating to offensive and defensive coast warfare. The great good that would arise from such a commission as that alluded to, must become obvious. The soldier and sailor may frequently meet and talk well on those subjects, but it requires the official stamp and status to give durability and profitable powers to the many invaluable hints and suggestions that are made, and then pass away. How many millions might have been saved, how many lives spared, how many luckless conjoint operations successfully terminated, if there had been some such link established between the two professions, and which could have made

its voice heard and attended to. The truth of these observations could be easily established, looking at recent events alone, but I must here conclude my remarks on the subject, as it is too important to compress within the limits of a discussion of this character.

Vice-Admiral HALSTED: I should like to say a word or two upon this question, but quite in advance of the discussion which, as I gather, has taken place. The portion of the paper which forced itself upon my mind as the gist of the whole question was a paragraph on, I think, the 8th or 9th page, which I have taken the trouble to transcribe, and which confirms my own long-entertained impression—right or wrong—that future war will never assume, in a naval point of view, the abstract naval operations of fleet against fleet, going out to fight a sort of game-cock battle in the middle of the ocean, knocking one another to pieces, and then coming back, repairing and refitting, and having the same thing over and over again. I think, since we have had practical experience of the power of self-contained locomotive means within all ships, that everything of that kind has perfectly passed away and is gone. Even in the days of the first paddle steamers, what we saw was, that, as our ships were somewhat enlarged, they were fitted with a troop-deck, and the size of the troop-deck, and the facility for transport of troops, not merely as temporary transports, but for such length of time as might be required, were considered to be important points of relative merit. We have seen that practice expanded of late years to a far greater extent, and if we look for the initiative, as it were, of what I think will be the kind of future warfare, we may go back to the days of the transport of the first *corps d'armée* of Louis Napoleon, before he was Emperor, when he made the most recent conquest of Rome, and transported by sea in three or four days the whole complete force, which attacked the place, and ultimately got possession of it. Then, again, in our own Crimean war, a similar mode of attack took place. It was our combined military and naval power which no doubt produced that terrible effect and deep impression upon the Russian Empire. Then, again, after that, in the Austrian war with France, whole French armies were transported in their ships of war, as well as in their transports; and although the war had to be maintained in the upper parts of Italy, and there was fought out, all stores, supplies, everything of that sort, were again brought to the scene of action by sea transport. Then, again, so recently as 1867, the present occupation, or re-occupation we may call it, of Rome, took place by the same means. Then, again, if we go across the Atlantic, the whole of that terrible internecine fight was carried on by combined naval and military operations. It is difficult to say whether it was carried on most by water or by land. Very little was done without the aid of river navigation, without the gunboats, or without the Monitors. I am quite setting aside the question of the blockading of the southern ports; I am speaking of the *bonâ fide* scenes of action. Think of what took place up the rivers; the most important engagements were there. Then, again, the same thing is seen in the long-continued strife that has taken place in the very heart of South America, in Paraguay. That would not have come to a close without the introduction of ships into the very heart of the country, and a series of combined operations. Therefore, I believe, rightly or wrongly, that all future warfare will be carried on by a combined military and naval force, upon the coasts, in the rivers, up the estuaries, in the ports, on the lakes and canals, and in every place where armed ships or transports can float. If that opinion be right, then, I think, so far as we are concerned, and so far as all other nations are concerned, and if it is to be the established mode of future warfare that it shall be carried on by the combined operations of fleets and armies, then I say that Captain Hoseason's paper has been most opportune and most valuable and important. Such a warfare can only be carried on by having the preparatives ready, and those preparatives do not consist of ships of war only, but there should be also a powerful means of transport, and not merely such a transport force as we have at present. My most able friend and brother Officer at the head of the present Transport Service, of course well knows the great value of all the means of transport he has organized between England and her great Empire of India. That is all done and finished, but there is no Reserve there. There is no power such as is contemplated, in the reserve of ships prepared and provided for the regular or contingent demands of our Indian Transport Service. I apprehend that our friend's

paper looks to a far larger question than that service involves, and that he takes the view which I do, that combined naval and military operations on various scales of magnitude are the future order of the day for all war. Now, looking at our subject from that point of view, I may be permitted to read an abstract, simply a sentence, out of Captain Hoseason's pamphlet, which to my mind constitutes the whole gist of the question before us. I refrain from discussing as to whether, in case of such combined warfare, the command should be with the Admiral or with the General, because I believe that it should continue, as now, to lie with both. Both would have common objects and purposes; both would mutually co-operate, neither interfering with the other, but each in his own sphere giving the best possible aid to the other in common loyalty to their country and sovereign. I think that the following is the most remarkable passage in the whole of the paper:—"It is by an efficient "steam fleet conveying a flying army, and not by blockading squadrons, that we "shall possess the power to keep the coast line of an enemy in continual alarm. No "town within 15 or 20 miles of the sea, should be safe from a nocturnal visit, and "the terror which a well-organized flying army on an enemy's coast would produce "must paralyze a force twenty times its strength." Of course the writer does not mean actually twenty times, but a very considerably greater force. Now I believe that passage represents, in short, the future mode and principle of war; and I have ventured to make that passage a text for some few observations of my own, because it perfectly coincides with my impressions and my own views and convictions entertained for some few years past, so much so, that I have both put them forth and also illustrated what in my mind should be, as far as ships of war are concerned, the part they should be prepared and provided to take in these combined operations. I read these observations with the more satisfaction at the present day, because it is only since the recent return of our channel fleet that the great obstruction to all future progress has been removed by the decision how our future ironclads should be armed. I apprehend that in the combined evidence furnished by the "Monarch" and the "Captain" the principle of turret armament has been determined for all navies, and that we shall no longer have the strifes and controversies whether modern armour-plate guns are best carried in turrets or on broadsides. I think that question is now decided; and on that view I will just read very briefly what I have put down here by way of presenting a practical point of view, and showing the mode of war ship which, as I think, will best fulfil the purposes required in future warfare.

The CHAIRMAN: You are going now to allude to the Transport Service?

Admiral HALSTED: Perfectly; the Transport Service.

The CHAIRMAN: We have no question of turrets before us.

Admiral HALSTED: No, no; it is a question of ships.

Captain HOSEASON: If I understand Admiral Halsted aright, he has anticipated this, and would make his turret ships transport ships also.

Admiral HALSTED: Just so; I have gone beyond the present aspect of the question, and my view is that our ships of war should also be thoroughly provided and equipped as very large transports; as ships for conveying anywhere this real "flying Army," which term, I think, has been very happily selected by my friend Captain Hoseason. You will find what I now read very brief, and, I think, practically to the point:—"If we take the ordinary frigate as the type for our future turret ships, fighting the "heavy turret guns, as chief armour-plate weapons, from over the upper deck of such "a ship as 'Achilles,' we shall then have a main-deck free for the permanent "accommodation of a large body of troops, besides such supplementary guns as land-"ing operations must require, and leaving the lower deck undisturbed to the crew." Again, whenever our turrets come to fulfil the principles on which they were first proposed, viz., that they should be complete ironclad fighting machines, with offensive and defensive powers self-contained within their own limits of circumference; then they will no longer make demand on their own account as now, for armour also on the hull, which may therefore be reduced to what is solely requisite for the vital protection of the ship—herself as distinct from her turrets; and then we shall be free to establish the true ironclad principle of giving to both ship and turrets a maximum of protection with a minimum of armour. A competent spar-deck over the turrets, as in the "Captain," will then enable us to fight the ship under sail only,

as formerly, should the engines or gear be disabled. If we then add a complement of armed steam boom-boats and quarter-boats sufficient to tow and protect the landing and embarkation, in one trip of, say 800 troops, conveniently carried in light, collapsible, safety troop-boats, readily steered—we shall then have provided, as I think, a mode of future war ship capable of services so superior in extent and importance to anything of the past, as amply to repay whatever their increased cost out of their increased value as floating war-engines. Such, in brief, were and still are, the views put forth by myself and professional friends in the modelled system exhibited at Paris in 1867, and now public property here. It is therefore with special interest that I have listened throughout to the perfectly independent, but perfectly similar views, embodied by our gallant friend the Lecturer, with whom, and only in mere detail, I do not differ, so much as—I perhaps exceed in this—that whereas he proposes the preparation of an abstract transport force, I still further advocate that every more important ship of our "Navy of the future," should herself be assigned and prepared for forming an integral part of his "Flying Army." This Institution possesses the descriptive work which I presented to its Committee before going to Paris; and out of that work I will now ask to read one more brief extract. It is almost identical with the previous one which I have read, viz.,—"Let us for instance "say thus:—Five ships of any of the first five rates have embarked an effective body "of 4,000 troops, independent of their Marines and ships' companies, and which are "capable of being landed or re-embarked by the four troop-boats, and the eight self-"contained steam life-boats of each ship, each with its pair of boat guns mounted "for 'all-round fire.' If these ships, as intended, can indeed realise a mean speed of "12½ knots, or 300 miles per day, or even nearly so, who shall say when once out of "sight of land, what spot of an enemy's coast they shall threaten, or land on, and there "find awaiting them an adequate force ready to resist." I believe that such is the direction in which future war will take its shape, and I am fully aware that in France the same view is entertained. A great discussion upon this very point took place when the French fleet were here in September, 1865, and since then my own communications with France have led me to know that that is the direction in which future war is viewed as inevitable in that country. I believe that they are now preparing for it. I believe that not only are they working out their Transport Service to a far greater extent than we are with express regard to such a mode of warfare, but that they are preparing some of their old wooden ships further to supplement those transports, and I have recently had a work sent to me from a friend in Paris, a very able young Officer, giving in detail what we did not at the time seem to be aware of during the great war, namely, the extreme pressure which our then imperfect "coast-warfare" imposed upon the whole of France. They felt, but they then said nothing about it; but they have been perfectly aware of what it means, and are quite prepared to try their chance at imposing upon others, or on us, if it should be necessary, what we then imposed upon them.

Admiral INGLEFIELD: I wish to ask whether the question before us, which has been raised by Captain Hoseason, and answered by Admiral Ryder, is not as to the command of the squadron, whether or not it shall be entirely under the Minister of War? It seems to me that is the principal question under discussion, and that it would be irrelevant now to touch upon some other points in the paper which I might otherwise have alluded to. May I ask if, after Captain Hoseason's reply, any further discussion will be allowed, or any rejoinder?

The CHAIRMAN: No, I think the discussion will be closed this evening, unless some member moves a further adjournment.

Captain HOSEASON: It is so important a discussion that I shall claim the advantage of a rejoinder, which is a lawyer's advantage, and therefore any question you like to ask I will answer at once.

Admiral INGLEFIELD: Then the question I ask is, on page 7 of your paper you make use of a remark that "it is obvious that a great economy is to be effected by "a judicious mixture of the cargo, but even a much greater saving could be ob-"tained at a very small sacrifice of the mean speed of the vessel, by directing every "steamer so employed to tow a fine clipper-built sailing-ship of about one-third of "her own tonnage, which vessel might be laden with *materiel* of all kinds. Less

" than one mile and a-half an hour will, in moderate weather, be the average loss of " speed on the entire voyage, therefore a steamer would not be retarded more than " three days in a run of 3,360 miles." I was going to ask, do not you consider it would be, perhaps, a better arrangement if, as was tried in the Mediterranean squadron when I was cruising with it, the transports themselves should be powerful steamers carrying all the men and material for the war, and towing the ships-of-war, so that at any moment they might be cast off and ready with their full amount of coal to perform any service required, thus saving their expenditure of coal till their arrival at any point where the operations are to be carried out. I propose that in preference to what you have suggested here.

Captain HOSEASON: I think you will find, when I come to my rejoinder, that they are two distinct questions.

Commander PHILLIPS: I wish to ask you, Captain Hoseason, whether you are aware that the system of warfare which you sketch, and which has been in some degree agreed to by Admiral Halsted, viz., that of ravaging a coast by means of an expedition combining a naval and a military force, is exactly that which was recommended in the Prince de Joinville's pamphlet when Louis Philippe was on the throne of France, and which excited so much indignation. Do you think it possible that such a system of warfare would be permitted by public opinion in this country, or in any other? Of course in asking this question I am aware it is very important that there should be an efficient system of transport service, and as Admiral Halsted has said, men-of-war should be also constructed so as to be able to carry troops in abundance, but to employ them for the purpose of ravaging an enemy's coast I imagine would never be permitted by the public opinion of Europe, and especially of this country. It was the fact, that Prince de Jonville's pamphlet did excite at the time great indignation, from the effect of which he has never quite recovered his character.

Captain HOSEASON: It is certainly a source of great satisfaction to me to find that the points of difference are so limited. I had not the most distant conception that I should find such unanimity. I am charmed to hear that my friend Admiral Ryder admits that the Minister for War ought to be Minister for War, not merely in name but in reality, and that during war he ought to command both the Army and the Navy, and not be subject to have his orders called in question by any subordinate naval authority in immediate command of the transport fleet at the extremity of the globe. I am truly pleased to find that Admiral Ryder entirely agrees with me on this important point, and moreover, that the sense of this meeting is also with me, when I state, that future wars will mainly be combined military and naval operations. But there is a misconception in Admiral Ryder's mind when he imagines that I advocate the removal of the Transport Service entirely from the control of the Admiralty. As a nautical man I see practical difficulties of a serious nature in the way, which would deter me from advocating any such proposition. I am desirous only to place the Transport Service for Army purposes on a far more efficient footing, and the object which I seek will be effectually obtained, if the Minister for War's authority is admitted to be as binding with respect to the Navy as to the Army. There is no possible doubt that the entire Naval Transport Service has been heretofore most inefficiently and extravagantly conducted; no Army has been landed in an enemy's country with the rapidity and order that is capable of being accomplished; confusion has reigned predominant in all our joint military and naval operations, and I trace that want of order and efficiency directly to the little interest bestowed on this important branch of the public service; and I perceive the absolute necessity for a full and searching enquiry into the present working of the system.

It must be evident that no Minister can conduct a great war unless he has complete command of all the transport to be employed during the war, whether it be naval or military. No distinction can possibly be drawn as to the kind of transport used; his power must be complete as commanding the whole; no broken link in the authority can be permitted to exist, if uniformity of the working is to be expected. It is not sufficient that the Minister for War shall control the Horse Guards if he cannot control the Admiralty also. Great operations can never be carried on by divided authority. It is well that we should reflect upon the changes that the intro-

duction of steam and the use of the electric telegraph have introduced into both services. Military operations can now be conducted from a *sea base* with as much security, and with infinitely more rapidity, than from a land base of operations; it therefore is imperative that the whole question should be fully investigated, and the relative subordination of all parties to the Minister for War, clearly defined.

Admiral Ryder has asked me if I have perused the contents of the Blue Book he has so freely quoted from, and well weighed the evidence contained therein. Every line of the book in question has been carefully perused by me, but I attach but little value to mere matters of opinion, unsupported by reasoning on the facts of the case. I observe, however, that Admiral Ryder does not quote from the evidence of the Duke of Newcastle, who had been charged with the conduct of the late Russian war, nor does he allude to the evidence of His Grace as to the powers and authority he possessed as Minister for War.

It is evident that in the late war in Abyssinia the Admiralty, as Admiral Ryder admits, declined to word Captain Tryon's instructions as desired by Sir Stafford Northcote, the Minister directly responsible to the country for the conduct of the war. He requested that the Officer in command of the sea transport, Captain Tryon, should be subject to *the control* of the Governor of Bombay, and the Commander-in-Chief of the Expedition, Lord Napier. This the Admiralty declined to do; consequently Captain Tryon arrived at Bombay with powers, as described by the correspondent of the *Times*, that would have brought him, had he not possessed much judgment, in direct collision with the Governor of Bombay, the Commander-in-Chief of the Expedition, and all the authorities. The good sense of Captain Tryon told him, even when at Annesley Bay, that he could not exercise any such powers with advantage to the State, and he distinctly informs the members of the Abyssinian Committee, who are investigating into the conduct of that war, that having *no orders* from the General to the contrary, he retained the transports in the service—in fact he only acted under the immediate instructions of the Commander-in-Chief in everything that had relation to the interests of the Army. The question, however, to determine is, ought instructions to be so worded as to leave the security of an Army to depend on the prudence and discretion of an Officer similarly situated? I am perfectly certain that the facts of the case need only to be stated, to carry conviction to the mind of all parties free from any professional bias.

Admiral Ryder has referred to the deterioration of coal on foreign stations, as some explanation, I suppose, for the total lack of fuel to be found on the declaration of war at our great military stations, which has heretofore so effectually served to paralyze the vast naval and military resources of this great country. I cannot receive, however, this estimate of the deterioration of fuel as correct. I believe it to be greatly exaggerated, and worthless as a record of facts, as I certainly found it to be whilst navigating the seas of Australia, New Zealand, India, and China. No individual perhaps has ever carried out a more elaborate series of experiments on the relative economy of different kinds of fuel obtained in those seas than I did whilst performing voyages extending over 75,000 nautical miles. Whether coal suffers by deterioration or not is a matter of trifling importance when weighed in comparison with the gigantic expenditure that is incurred to render the Army and Navy efficient. In all past wars we have encountered no difficulties but those of our own creating, and caused by our own bad management. If coal delivered at the Cape of Good Hope cost £6 10*s.* a ton and £7 a ton at Annesley Bay during the Abyssinian war, what would the charge have amounted to, had we to supply such deficiency in the event of a war with France, with fast steamers issuing from the ports of Cherbourg, Brest, and Rochefort? The entire sum voted on the Navy Estimates for coal this year is but £221,000. If this is a measure of the annual charge to the State, I trust we shall hear no more of the comparatively trifling loss to the country by the deterioration of fuel, for I contend that the true loss can only be a fraction of this original outlay, whilst, on the other hand, the prestige of this country and its vast floating wealth may at any moment be annihilated by that ill-judged parsimony that lavishes millions upon millions on naval and military establishments, and yet at the outbreak of war renders all nugatory, from mere lack of fuel in the Government stores, to enable us to put in motion our naval and mercantile steam fleets.

Whilst serving in the Indian Seas I was the guest at Bombay of the late Sir Robert Oliver, Commodore of the Indian Navy, who always insisted on keeping 40,000 tons of fuel at that port, which he said would some day be the cause of the saving of India; he evidently anticipating an outbreak in that country. I believe, if the facts are fully inquired into, it will be found that Sir Robert Oliver maintained this amount of fuel, without any loss to the Indian Government, by selling it from time to time to the English men-of-war and other steamers in want of fuel, charging them a price that re-imbursed the Indian Government. Sir Robert Oliver told me that he made no contracts for fuel, but only made it publicly known that he was at all times ready to purchase from ships that had fuel to dispose of equal to the sample required. If similar establishments were formed at all our great military stations, and conducted with equal prudence and economy, it would greatly add to the military strength of this nation, whilst it would be found to give an enormous impulse to steam navigation, a feature of great national importance to the empire.

Admiral Ryder has stated, with great truth, that the paper before the Institution, although it appears under the modest heading of "The Necessity for an Increase in our "Naval Steam Transport Fleet for Military Purposes," really aims at transferring the *control* of that important branch of the public service to the Minister for War. I freely admit that to be the real purport of the paper, and I have clearly suggested the means by which it can be carried into effect in my "Plan for rendering the over-"Sea Transport for Army Purposes more efficient, and for bringing it more under "the control of the Minister for War."

As we are all agreed that the Minister for War ought to be Minister not merely in name but in reality, it is only a question for the Government to consider how such control is to be exercised, for Parliament and the country will never countenance the notion that both of these important branches of the State can be permitted to carry on an independent war of its own. We are all well aware of the fact that continental nations mature plans of military operations during peace to be carried into execution on the first outbreak of war, and we have seen in the case of Prussia with what economy, rapidity, and efficiency these vast undertakings can be accomplished, if only well reflected upon during peace, and the means well adjusted to the end.

Mr. Cardwell, as Minister for War, has submitted to Parliament regulations in which the positions and authority of the several departments at the War Office are clearly defined; but such regulations, however perfect in themselves, will have no cohesion when an Army embarks for foreign service, unless the Minister for War's authority is as binding on the Navy as upon the Army. What benefit will arise from the establishment of the most perfect control department in this island when the whole system may suffer disruption on the embarkation of the Army on foreign service?

The Controller-in-Chief, with the authority of an Under Secretary of State, might, or will find himself controlled in executing his duties, not only be the head of the Naval Transport Fleet at home, but even by his agent abroad; and whilst peace lasts no attempt will be made to perfect a branch of the service which is as nationally important as the Navy itself. No person who reflects upon the subject will deny that all future wars will mainly be conducted as joint operations, and consequently it is our first duty to subordinate one department to the other, with a view to greater unity of action during war.

I believe I have now answered every objection raised by Admiral Ryder, and have fully explained the views I entertain.

With Admiral Halsted I find I am in entire accord, for he is as firmly convinced as I am, that the system of warfare as carried on before the introduction of steam and the electric telegraph, has ceased; my plan for the employment of a flying army on an enemy's coast line, so highly approved by him, being objected to by Captain March Phillips on the ground of its being un-English, I have to observe that I have no intention of ravaging a coast, nor of adopting a system of buccaneering, as imagined by the gallant Officer. I propose simply to put in practice the same system of warfare *from a sea-base of operations*, as all continental nations exercise from a land-base, and of which we have a notable example in the late Prussian war with Austria.

Count Bismark levied contributions to defray the expenses of the war on every town he occupied, and it is generally imagined that he not only re-couped himself for all the expenditure of that campaign, but greatly added to the resources of the treasury; and I am aware that I am making this assertion in the presence of a distinguished Prussian Officer, who is no doubt conversant with the truth of my assertion.

Admiral Inglefield has directed your attention to an important service to which a fleet of large transports can be applied, especially as we all appear to be agreed that future operations will be joint operations conducted by the Army and Navy.

The weak point of ironclads is their inability to carry a large quantity of fuel, and the great expenditure needed to develope even a moderate speed. The experiments to which Admiral Inglefield alludes, are those which were carried out in the Mediterranean, and in which he took part, when the several ironclads were directed to take one another in tow, and note the expenditure of fuel. He contends, therefore, that a transport, laden with troops like the "Crocodile" class of 4,200 tons burthen, and stowing 1,300 tons of fuel, would, from her large size and great towing power, be able to tow an ironclad to the Mediterranean, or any part of the Mediterranean, in any joint expedition, with little sacrifice of her maximum speed, but with an entire saving of the fuel so necessary to keep intact, in the bunkers of the ironclad. The loss of speed per hour in a vessel of as great momentum as the large class of steamers in question, would not, on an average, exceed perhaps a mile and a half an hour, whilst the saving of fuel on the gross tonnage moved, might be 50 or 60 tons a-day. This case cited by Admiral Inglefield, however, totally differs from the one given in page 7 of my paper to which he refers.

The instance of economy there referred to, is that which can be obtained by taking a sailing vessel in tow. I will suppose the "Himalaya," of 3,000 tons burthen, to be towing a fine clipper-built sailing vessel of 1,500 tons burthen. It is well known that the capacity for carrying a cargo is relatively small in the steamer in consequence of the weight of the engines and space occupied by the coals; but a sailing vessel of 1,500 tons' measurement will stow about 2,000 tons cargo; and when thus taken in tow would on a voyage from England to Constantinople or Alexandria, have her voyage accelerated by about *thirty-five days*, whilst the "Himalaya" would not have her voyage retarded more than *three days*. The economy of this mode of transit is *enormous*, both as to time and money; but the towing-vessel ought always if possible to have far greater momentum than the vessel towed, in order to enable her to tow with efficiency and economy; hence another great advantage of possessing a fleet of large ocean transports.

A sailing vessel of 2,000 tons' capacity will, by Commissary-General Filder's estimate, carry all the provisions necessary for an army of 45,000 men for a month; such an amount of cargo would require 24,000 mules to convey it on their backs from the beach to an army in the field, and if carts are employed, about one-third of that number; thus we perceive the rapidity, economy, and efficiency of water transit moved by steam. It now only remains for me to thank you for the attention which you have bestowed on my paper, and for the fairness of the discussion which it has elicited.*

The CHAIRMAN: I am sure that you will all join with me in thanking those gentlemen who have taken so great a part in the discussion this evening, for we have received a great deal of valuable information from them. The discussion itself has been a most interesting one. As far as I can judge, it has divided itself into two different subjects, one of which may be said to be the "establishment of a transport fleet during time of peace." That question appears to be generally agreed upon by all parties here, and there is not a doubt, that in consequence of a lack of such preparation, the country has been put to a very great deal of expense and delay in

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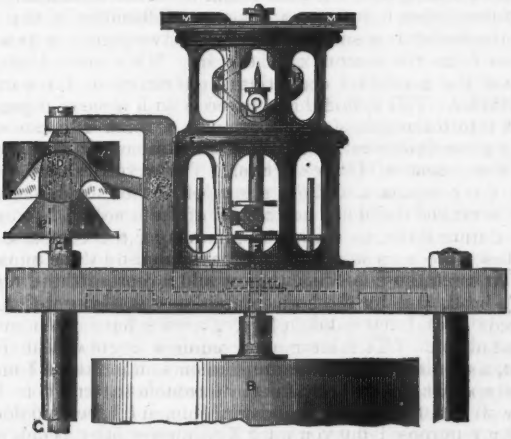
* Captain Hoseason has requested that it may be stated, that the pamphlet printed by Rear-Admiral Ryder, "being remarks which he proposed to make on the 20th of June, at the adjourned discussion," was not put into his (Captain Hoseason's) hands by Admiral Ryder, until the 6th of July.—ED.

carrying out its operations in war. It is perfectly true that in this country there is a jealousy on the part of the mercantile marine, of the British Navy interfering with what they term their legitimate profits in carrying troops, but I think it has been so far shown that the troops can be carried with greater comfort, with greater facility, and with greater advantage to the service, in Government transports than in vessels of the mercantile marine. I believe therefore that it will be found eventually that the Transport Service will be done almost entirely by the Royal Navy. The other question, one which has caused a great amount of controversy, is that of the "divided authority." I quite coincide in the view, that whenever we go to war, we must have one supreme authority. As the different branches of the Army—the artillery, the cavalry, the engineers, and the commissariat are under the General, so I think the Transport Service might be placed under his control, provided it was a predominant military operation; but there are occasions when the expedition is more of a nautical than of a military character, and in that case, the command should, I think, be in the hands of the Admiral. Such was the expedition in which I was first engaged in China. It will be remembered that the Officer sent out there as plenipotentiary was Admiral Elliot, who had supreme command over the troops. When he left us, Sir Henry Pottinger was sent out as Plenipotentiary, and there was a divided authority between the naval and the military Commanders-in-Chief, but no difficulty whatsoever occurred. They had a Council of War to determine where they should go to, and then a joint operation took place; but I conceive that during war it is essentially necessary, for the good of the service, that there should be one supreme head. I am sure, gentlemen, you will join with me in thanking Captain Hoseason for having brought forward so useful a paper.

DESCRIPTION OF A REGISTERING COMPASS.*

By Captain Arthur, R.N.

I daresay that many of you have often found the want of having some record of the progress of a vessel during the night when the steerage



* Exhibited and described at the Evening Meeting, on Monday, May 30th, 1870.—Ed.

is bad, and there is some suspicion that a wrong course has been taken. I have found that myself, and have consequently designed this registering compass in order to record the course of the vessel. The lower part is clock-work, which is not shown in the drawing; the clock-work turns a pinion wheel, connected with the horizontal rod, G, which rod is threaded, and is designed for moving a pencil held in a framework, from top to bottom of the cylinder, B, in the course of twelve hours. Each of the horizontal divisions on the cylinder shows one hour. During the time the rod, G, is turning, the cylinder, C, at the top turns; as the cylinder turns, the roller, D, goes down, and as this roller descends, the lever, E E, to which it is attached, and which is pivoted at K, forces up the hollow rod, *f*, which should have been shown as smaller than the rod F, in which it works. The point on which the needle is suspended is at the extremity of *f*, and as it rises the needle, M, will be suspended, and will take up its polarity. On M would be placed the compass card; underneath the compass card you have two inclined planes, I I. There is an arm projecting at L, which ascends and descends with *f*; it is shown at the bottom of the inclined planes, but when the needle is suspended, it is above them. If during the two minutes that the needle is suspended, the course of the vessel turns in any way, the north point remains steady, but will have altered relatively to the arm, L, which in descending comes in contact with either inclined plane, and the rod, *f*, is forced round, carrying the cylinder round with it. By this means, the cylinder is made every time to point due north, but should the ship's head not have altered in any way, the arm, L, merely descends into the position now shown, and ascends again, not having altered the position of the cylinder. My first idea was, that the needle might be made sufficiently strong to turn the cylinder, but there are many difficulties in that; one is, that if the cylinder is suspended between two points, it gets a motion of its own from the motion of the ship. My second idea was to make use of the needle for correcting the direction of the north point of the cylinder. This cylinder is covered with a piece of paper, which is divided into the points of the compass. I think I can show you, by taking the cylinder out, very much the same result that you would have in the course of twelve hours. The vertical lines show the points of the compass, and the north point of the cylinder, when it is put in, is arranged under the north point of the needle. Now, you will observe, during the time I have been moving the compass, the same effect takes place as would have been produced by the motion of the ship. You see these fine lines, they would represent the direction of the ship's head, and by the horizontal lines you also get the time of the records that have taken place, as we have been moving the instrument about. This instrument requires a great deal of care and judgment, as there are several adjustments in it; these I find people, generally speaking, will not take the trouble to attend to. I should be very well satisfied with it on board ship, and I have no doubt it will answer my purpose; but you want it to answer other people's purposes who might not be so careful. Now, I am constructing another one, in which we have two small cylinders, the same length as the

present one, and you use the same turning power, but on one of these small cylinders there is a long strip of paper. This strip of paper unrolls by the clock-work. On the other cylinder you have a rib rolled round it, and touching the paper, the point of contact being high or low, according to the position of the needle, and on the strip of paper you have the record of the time and direction of the ship's head, in the same way that you have the record here. Since I first introduced the compass shown, several people have seen it, amongst others an Officer of the Italian Navy, who has produced another one, which differs from this in many respects; but it has, also, the combination of time of record with the course which is here given. This is done by him by means of a small strip of paper passing under the extremity of the compass card, and every minute, or two minutes, the whole are pressed together, and the course is printed on the strip of paper. This is certainly simple, but several people have said that looking along a strip of paper does not give the same idea of how a ship has been steered, or what course she has been going during the night, as looking down a plane where you can see the divisions. I intend, shortly, to arrange another plan, differing from any mentioned, and that is to employ our standard compass needle, which will be touched by a peculiar arrangement of telegraph wires every minute, and by that means the position of the ship's head at the moment of contact will be telegraphed and recorded below. I think it will be much simpler, as you will then have the course laid down in the cabin; it will not interfere with the standard compass in any way, as it will merely touch the card for a moment, and it will remove one of the difficulties in constructing these instruments, which consisted chiefly in having to do away with steel or iron, and to use gun-metal, so that the needle should not be affected. I may tell you that even the clock-work spring is made of gun-metal; there is not a piece of iron in the whole construction.

Admiral HALSTED: Such a compass is very much wanted. The suggestion we have to make is that you go on and prosper.

Captain BURGESS: What would be the cost of a compass like yours?

Captain ARTHUR: The Russian Government have one that cost about £50, but I should tell you that a standard compass will cost £50 when you have got it into position.

Captain FREMANTLE: Is that the same that was in the Exhibition of 1867?

Captain ARTHUR: The same with some slight alterations.

Admiral RYDER: Has that or a similar one been to sea in a ship?

Captain ARTHUR: A similar one.

Admiral RYDER: And doing good work. The motion of the ship does not affect it?

Captain ARTHUR: It is suspended in gimbals. The motion of the ship does not affect it. My idea is to place it in a part of the ship where there is no local attraction. With iron masts and wire rigging, you say, where will you put your compass? It is rather a difficult question to answer. The consequence is that the compass if put below will be between two iron beams; I have seen a standard compass between two wire stays.

Admiral RYDER: Have you ever thought of trying photography for registering?

Captain ARTHUR: There are difficulties about it. You can do it in the day time, but in the night you want a bright light; however, it has succeeded very well in several cases by using reflected light.

OBSERVATIONS ON THE DEFENCE OF ENGLAND.*

By Lieut.-Colonel F. J. Soady, R.A.

The amount and description of force which would be employed by a power, attempting to invade our shores, being of necessity uncertain and unknown, and the force at our disposal for the purpose of defence, being also dependent on relations with other powers and contingent circumstances, we may presume that the opposing forces would be likely to be included, in one of the following cases:—

1st. That the power threatening the descent, is superior in the numbers of its land forces; and, but little inferior, if not equal, to the naval forces which would be available for the defence of our shores.

2nd. That from complications which may have arisen, a considerable portion of our naval forces as well as of our regular land forces, have been despatched to strengthen and defend colonial dependencies; also, military and isolated possessions, occupying important or strategical positions. That for the protection of British commerce and interests on the high seas and in distant parts of the world, additional naval forces have been also despatched.

3rd. That two States, powerful on land and sea, have combined to make a descent on our shores, with forces outnumbering our own.

The frontier of Great Britain, from its insular position, being the coast, the defence of the coast or frontier line is proposed in the first instance to be considered. In the first case alluded to, we might rest fully confident in our ability to preserve intact the channel, and to intercept and bring to action any hostile naval force approaching our shores; but the general security on which the country might repose under such circumstances might doubtless be viewed with uncertainty. The introduction of steam is admitted to have facilitated the means which would be at the command of a naval power seeking to make a descent on a coast; and the same agency aided by the electric telegraph, will still more favourably act and simplify operations on the part of the defenders, accelerating their movements, and enabling the advance and progress of the invaders to be retarded, from the period of their reaching the shore. But the advantage conferred at the *commencement* on the side of the offensive, from the very fact of the invaders seeking to take the *initiative* in operations, presents also the opportunity of misleading and deceiving the defenders, and diverting their naval forces from the actual point of attack.

The calculation of time where the distance is limited, being capable

* The following observations, relating to the defence of England, were drawn up previous to the eventful period which has occurred on the Continent. We have now witnessed two of the most formidable military powers entering suddenly upon a war; the invasion of the territory of one of the powers speedily following the declaration of war.—F. J. S.

of being computed with as equal facility as in invasions by land, and the selection of both the real and false points of attack, according to strategic rules being conferred on the invaders, they would be thus enabled to concentrate their forces for the *first* essential object at the decisive point, and to fall with their whole undivided strength on the defenders who may be in that locality. Thus the disadvantages of not knowing where or at how many points to be prepared, together with frequent alarms, uncertain reports and rumours, increased by skilful diversions and feints, practised by the enemy's ships on parts of the coast and the adjoining seas, will be experienced by the defenders.

It must further be considered, that the defence of the coast, if dependent on naval forces alone, would require their presence at all times, and would also necessitate very large resources in ships, floating batteries, and seamen; nor could any portion of our fleet be permitted to quit our coasts for the protection of our widely-scattered commerce and interests throughout the world, or to render assistance to menaced colonial and military possessions. For similar reasons, the safe keeping of our naval arsenals and dockyards should not be dependent on floating defences. Fortifications, forts, and land batteries, once erected, may always be in readiness for defence; they not only offer in themselves and in conjunction with floating batteries and torpedoes or other channel obstructions, a barrier and resistance to the advance of an enemy with a superior naval force, but they also form places of refuge in which our ships and squadrons, separately or collectively, can assemble or take shelter at all times; as did the Russian Baltic and Black Sea fleets, in 1854–55. They are, further, more economical and endurable than floating structures.

Forts holding prominent positions in the outer defences of harbours and anchorage grounds, being at times isolated and self-dependent, and being also liable to be opposed to a close or concentrated fire, for such works, secure cover for the guns, with iron-plated exteriors, are considered necessary. A hostile squadron or fleet, having for its object the bombardment at long range of a dockyard or arsenal, would not take up a position for that purpose within the effective range of the heavy guns of such forts, without in the first instance successfully assailing them; their operations would then be carried out, without so much likelihood of molestation. For the ordinary and inner defences of harbours, granite or masonry forts, with the addition of iron shields at the embrasures, in conjunction with Moncrieff's system for mounting guns in batteries, will probably be deemed sufficient. Earthen batteries, *properly constructed*, are most formidable, presenting in themselves but little which is exposed or liable to serious injury from the fire of guns. They usually require some extra provision on account of barracks for the occupants, and a corresponding increase of space.

Forts and batteries, whilst efficiently protecting the amount of space within the range of their guns, might probably be so constructed and located, when the extent, nature, and elevation of the site permitted, as to cause it to be difficult to concentrate a fire on them, thereby rendering the works less liable to severe injury, and preserving the efficiency of their armaments. A fort mounting from twenty to thirty guns, in

tiers, erected on a limited space of ground with high exterior walls, would naturally present a more attractive target for an enemy, and would be struck with more facility than the same number of guns distributed in two or three smaller forts, at intervals, or than the same number of guns in a fort not mounted in tiers, but extended over a larger area, with the outer covering walls of reduced height.*

Lieut.-Colonel Von Scheliha, in his work on Coast Defence, after the experiences of the American Civil War, remarks:—"Wherever the position "will allow, a scattering of the guns is preferable to placing them close "together. A disposition of this kind does not exclude a concentra- "tion of fire from all the guns, whilst it renders it more difficult for "the enemy to effect a concentration of his fire on any one battery." It must, however, be admitted, that there may be cases arising from the site being naturally low and the depth of water considerable near the shore, where it is necessary to establish a sufficient command over the high water level, and where guns arranged in tiers might be deemed specially applicable.†

In channels which are open and not tortuous, also of sufficient depth and *free from floating or sunken obstructions*, steam-ships desirous of approaching and *passing* land batteries, can do so, as has been demonstrated during the late American war. Such adventures cannot, however, be undertaken with impunity; the chances of being struck, and the ships or the armaments being disabled, would be incurred; the risk increasing with the improved nature and weight of the armaments of land batteries. "Crossing the range of a 12-ton gun, mounted in "a casemate, or in a battery, where the traversing angle is 70° at a "distance of 1,000 yards, at a speed of ten miles an hour, a vessel

* We might reverse the case, and take by way of illustration:—

1st. A vessel of war carrying her guns on two decks, attacking land defences.

2nd. Two vessels of war, mounting together the same number of guns as the two-decker, and carrying them each on one deck, attacking the defences.

In the first case, the fire of the batteries would be directed and concentrated on one object, represented by the length and height of a two-decker. In the second case, the fire would be directed on two separate objects, represented by the two smaller ships; but we should be unable similarly to concentrate the fire of the batteries on the attacking guns; our fire would be divided between both objects.

† The idea seems to have generally prevailed, that, with *field artillery* for the purpose of assailing a particular part of a line with a heavy fire, the tactics introduced during Napoleon's campaigns were to *concentrate the guns*, and direct their fire as required. This, however, is an error, as will be found by referring back to the period when the concentrated *fire* of artillery on a field of battle was first applied by the celebrated General of Artillery, Baron de Senarmont, at Friedland. The two grand batteries at this battle, as shown by Senarmont's own report, were not massed, but separated, in order to obtain a cross-fire, which relative positions were maintained until, as stated in Victor's report, their junction was necessitated by the configuration of the ground. (Vide Memoir of Baron de Senarmont, by the French General Marion.) In *concentrating the fire* of batteries on any desirable point, it will be manifest that a larger area will be swept by their converging fire, when the batteries are extended (which, with the range of rifled guns, has proportionally increased), than when the batteries are assembled *en masse*. An additional advantage conferred by distributing the guns is, that whilst we obtain concentrated fire on an important or decisive point, a similar concentrated fire cannot be directed on our guns in return.

"may be fired at six times; as the range is increased, or the speed is "diminished, a proportionately larger number of shots may be fired at "her, *cæteris paribus*. The 22-ton gun would have fired at her three "times."* It is, however, unlikely that a fleet would endeavour in force a passage, unless as reported by the Royal Commissioners, in 1860: "It can, by continuing its course, arrive at a space where it "would be comparatively unmolested, and be free to carry out some "object of importance, such as the destruction of a fleet or dockyard."

On the subject of coast defence, the late Sir Howard Douglas has quoted the following report on National Defences of the United States: "Our friends of the United States, in their report on national defences, "lay down the principle that all assailable points on the coast should be "guarded by forts and land batteries, so as to leave all the naval forces "of the country available for naval operations. Forts, they say, can "be made impregnable against any naval force that can be brought "against them, and are needed for the protection of the fleets while "preparing for service on the ocean; the substitution of floating bat-"teries for land defences would be to employ batteries of perishable "materials, which might be inefficient when sudden danger menaces; "* * * If we rely for the defence of our coast on our naval "force, our means of protecting our foreign commerce must, by so "much, be absorbed. To employ, therefore, our active navy, in whole "or in part, for the defence of our coast, instead of strengthening our "fortifications and constructing new ones, would be to supplant im-"pregnable bulwarks by perishable ones—a fixed security by a change-"able one; and it would be to expose ourselves to the chances of "being suddenly left for a time without adequate defence. We should "resign our sense of security, and our competence of safety; we should "divert our navy from its highest duty, deprive it of its chief honour, "and its chief claim to the respect and confidence of the people; and "we should lose, by so much, the power of vindicating the national "honour and our independence on the seas."

Although no power, *single-handed*, is *likely* to venture on so gigantic an undertaking, as a descent on the coast of the first naval power in the world; yet, may it not be asked,—Is it not more prudent, viewing the ascendancy and possible superiority which might now, at the first opening, be assumed by a *single* assailant, *to be forearmed*, and prepared under all contingencies, with abundant means of defence; thereby holding a confident assurance, in our national security?

As in the second and third cases alluded to, the invading forces would outnumber those available for the defence of our shores, it will be unnecessary to comment on those cases.†

* Report of the Committee on Fortifications.

† It is usually admitted that the command of the Channel, and of our coast, might, for a short period, be lost. By the combination of hostile fleets, those of our own ships and floating defences which would be found prepared and available, together with those which would require to be equipped and manned, might be outnumbered and insufficient. The Royal Commissioners report, "Since the application of steam to the propulsion of vessels, we can no longer rely upon being able to prevent the landing of a hostile force in this country."

Descents upon Coasts.

Forming a lodgment on our shores preparatory to its extension, or to the seizure of one or more unprotected spots from the land side, suitable for the establishment of a *base of operations*, would be the first essential point of an enemy. With infantry and a small proportion of the other arms,* every exertion naturally would be made in the event of a successful landing to move forward, and be found sufficiently firmly established to resist a first attack, before time had elapsed for our forces being concentrated in numbers sufficient to assail the position.† In seeking for a lodgment, it would naturally be advantageous that the part decided upon should be capable of affording protection for the subsequent disembarkation of the cavalry and artillery, with the requisite stores; combining facilities for such, with an anchorage for the fleet and transports.

Amongst the numerous discussions which have, in the course of late years arisen, as to the probable part of the coast which would be the scene of any attempts by an invading army; the south-coast has generally been presumed, from its favourable formation on many parts, and convenient position, together with the nature of the tidal currents, to be that on which the preference for a point for landing would fall. The east and west coasts have also been considered, and it has been further supposed that simultaneous descents on the three coasts might be attempted.

In a paper on the Defence of England, in 1851, by Baron P. E. Maurice, Captain du Génie de la Confédération Suisse, &c., &c., after discussing the probabilities of success or otherwise, attending the debarkation of an army at three different parts of our coast, viz.: the neighbourhood of Plymouth, the mouth of the Avon, and at Rye, Baron Maurice remarks that the question will be asked,—"Why should these "three points be selected, instead of uniting all the forces at a single "point?" The reply to which, as given by that writer, being,—
"Parce qu'une seule armée de 150 mille hommes trouvera bien moins
"facilement les voitures et les chevaux de réquisition nécessaires pour
"le transport de ses munitions, de ses parcs, et de ses vivres, que trois
"corps d'armée séparés. Parce que le côté faible de l'armée régulière
"anglaise étant son petit nombre, il vaut mieux la forcer à se dissé-
"miner et à agir contre trois assaillants séparément que contre un seul
"tout à la fois; il y a deux chances de plus pour l'assaillant de réussir.
"D'ailleurs, nous n'hésitons pas à conseiller que les opérations des trois

* At the unopposed landing of the allied armies in the Crimea, all the British infantry, with some guns, and three divisions of French infantry, with 18 guns, were landed by the close of the first day.—*Kinglake.*

† Brialmont has computed that, with the improved means at the disposal of expeditions, troops can be landed at the rate of 15,000 men an hour. The Royal Commissioners remark, "With the power of concentration which steam now affords, a force—to cover the disembarkation of an invading army—might be assembled before daylight upon any point selected for the attempt and thrown on shore in two or three hours."

" corps d'armée d'invasion soient combinées de façon à les faire marcher " sur Londres *simultanément* et *concentriquement*."

Baron Maurice also takes the case of two corps d'armée landing,— " the one at the mouth of the Avon, and the other in Whitsand Bay, " proceeding after the reduction of Plymouth to the attack of Ports- " mouth from the Gosport side, and eventually marching on London." These important places, Plymouth, Gosport, and Portsmouth, having since that period been defended on the land side, it is improbable that those points would now be considered in any contemplated descent upon our coast; other localities, however, would have to be preferred, where the means of securing a lodgment might appear.

It was a maxim of Napoleon that, " When the conquest of a country " is undertaken by two or three armies, which have each their separate " line of operations, until they arrive at a point fixed upon for their con- " centration, it should be laid down as a principle that their junction " should never take place near the enemy; because the enemy in uniting " his forces may not only prevent it, but beat the armies in detail."

Surrounded by a hostile population, offering every impediment to their advance, as well as opposed by the organized resistance of the regular and irregular forces, and acting upon lines far removed from each other, it is not to be imagined that separate bodies, starting from points far asunder, could attempt to open or maintain communications. They would consequently, unless the separate lines of operation were abandoned, and a skilful lateral movement commenced with the object of effecting a junction and deceiving their opponents, remain in ignorance of their individual progress, and be unable to calculate or arrange for ulterior movements. Whereas, the defenders operating upon interior and central lines, and with free communications, could combine to engage such forces moving upon convergent lines separately, previous to their junction.* Viewing these facts, it would seem more prudent on the part of the invaders, *not* to act from bases *far* separated, but from a point or points, not requiring the risk to be incurred of being attacked in detail by the defensive army.

The transport of provisions and stores, with the exception of ammunition, should the debarkation be carried out at a locality not far distant from the *object*, would be limited to meet first requirements only, and for a short period. Requisitions for the subsistence of an invading army, whilst success attended its operations, would, in a rich, well-stocked, thickly inhabited country, meet with compliance, notwithstanding every effort may have been previously mode by the determination of the people to remove and destroy the resources of that part of the country at short notice, including live stock, stores of grain and provisions of all descriptions, which would be sought after by marauders, or the means of conveyance and transport calculated to meet the wants of an army.

* This supposes that the *total* of the invading army would not be in excess of the field forces at the disposal of the defenders; assuming the probable numbers of an invading army, in the first instance, to be from 150,000 to 200,000 men. The large demands on account of transport which would be requisite to reach our coast would operate in limiting the numbers.

The desire of an invader being usually to push on without hindrance or obstruction towards the accomplishment of his principal *object*, and bring matters to an issue as speedily as practicable, it is improbable that a force sufficiently numerous would be detached from the invading army, for the purpose of besieging or observing such fortified places as Portsmouth, Plymouth, Chatham, or Dover, when not intervening as obstacles in its path; we might, therefore, anticipate that such places, protected by the skill of our engineers, would be avoided. Undefended on the land side, the important naval *entrepôts* of Portsmouth, Plymouth, and Chatham, would require the presence of a large field force to prevent their falling readily into the hands of an enemy's land forces; and the circumstance of such places having been left open and unguarded, would have invited attack; their sudden destruction would further have jeopardized our existence as a naval power. The attention which, within the last few years, has been bestowed on the land and sea defences of our naval ports, has been the means of conferring great additional national strength, both offensively and defensively.

When the Allied armies of England and France made their descent upon the shores of the Crimea, they having for their *object* the reduction of Sebastopol, and the capture or destruction of the Russian fleet, selected for the landing a part of the coast near Old Fort, which was, as we are aware, some distance from the point at which they aimed; but this locality permitted the lodgment being secured without molestation. When Wellington invaded Portugal in 1808, the ministry desired that the descent should be made at the mouth of the Tagus; but Wellington wished to avoid Lisbon, and selected a landing-place more remote, to avoid a debarcation in face of a large force. The mouth of the Mondego river, which was deemed by the enemy of minor importance, was chosen. Wellington moved forward as soon as he could, fought a general action, and obtained possession of Lisbon.* At the landing of Abercromby, on the coast of Egypt, few portions of the coast were considered suitable for the debarcation of his army; under the circumstances he was compelled to make his descent near Alexandria, with the knowledge that the operation would be opposed by the French. The importance of Alexandria affording the only harbour on the coast, and consequently a base for further operations, was great. The English, after the battle, fortified the front of their position, and blockaded Alexandria by a small body; troops were then detached, day by day, towards Rosetta.

Frontier Defence.

The opinion which at one time prevailed as to the defence of a frontier line, and the positions of fortresses, placing them in three rows at intervals of about a day's march from each other, and arranged chequerwise, has been departed from; such works, until recently, were

* Napier, vol. i.

treated with respect, and were usually invested or blockaded. The influence of fortresses is now admitted to extend only to a limited radius; observing such places by small bodies of troops prevents the garrisons from interfering with the operations or communications of an army in the front, and is now deemed sufficient;* whilst the garrisons requisite for these fortified posts weaken the available forces of the defensive army, and disseminate the detachments over a line of frontier. Colonel Hamley, in his "Operations of War," observes, "When a frontier is unmasked by any natural obstacles, and has "numerous issues, it is in vain to attempt to close it entirely with "fortifications; for an enemy, masking one or two of the strong places, "would penetrate the line, and still be superior to the defensive army "in the field, deprived, as it would be, of many troops for the ineffec-"tive garrisons of the frontier."

Wellington and Blucher, in 1815, after passing the French frontier, with Paris as their *great object*, pushed forward their advance without regarding the fortified places along the frontier: we find the Prussians also, after their victory at Königgrätz, advancing directly on the capital Vienna, notwithstanding a large portion of the defeated Austrian army, under Benedek, was in occupation of the fortified position of Olmütz, on their flank.

As points of but little importance along the coast or frontier line, not requiring protection for naval or military purposes, would, from the requisite garrisons, be a drain and source of weakness to the forces in the field, so it becomes necessary that the points decided on to be held, should warrant the conclusion that their security from attack is of vital importance; or that their occupation by an invading force would confer great advantages, and perhaps be the means of accomplishing the destruction of a dockyard or arsenal, or becoming a secure starting-point or base for further operations. "Fortresses should always occupy "the important strategic points." "Large fortified places, which are "not in proper strategic positions, are a positive misfortune for both "the army and the State." Such are the words of a most distinguished writer;† and in endeavouring to ascertain what should be the points to be held for the defence of a coast, we must avoid falling into the error of holding too many points, as did the Confederate States of North America. The principle not to weaken the forces, by the absence of *large* detachments, either on the coast or in the interior, should be maintained; but to be prepared *to concentrate with all despatch* in sufficient numbers, towards the threatened point, or on ground previously selected and prepared. It is not, however, intended to exclude certain parts of the coast, likely to be selected for a descent, from a simple mode of defence. When such localities are found to combine facilities for the debarkation of a hostile force, with the advantages of *not being far distant from the object* likely to be aimed at by an invading army, such places would undoubtedly derive considerable support when pro-

* This is not intended to apply to fortified places blockading a line of railroad, interfering with the transport of supplies and ammunition for the front: the possession of such posts being deemed essential for the supply of an invading army.

† Jomini.

tected by a fort mounting a few heavy guns, requiring but a small number of men as a garrison, and capable of resisting a *coup-de-main*; the fire of the guns commanding the anchorage ground, the approaches to the shore, and sweeping the landings.

Movements of troops, by railway.

To be in a position to retard the progress of a hostile force towards the interior, should a lodgment have been successfully carried out, our forces, by the aid of large supplies of railway rolling stock, and numerous lines, should be capable of being despatched and concentrated in any direction. We, however, should not be deluded into the idea that troops, with their ammunition and stores prepared for service, can be moved and concentrated in front of an active enemy, with the same expedition and facility as volunteers are occasionally transported towards certain points, such as Brighton, Dover, and Portsmouth. Such experience as a guide should be rejected, from the fact that hitherto, with volunteers, the description of troops conveyed to the places of assembly has been confined to infantry, and these without stores, provisions, or supplies of ammunition to be packed and transported; further, that the numbers to be conveyed, and the carriages required, the stations on the line at which they have to be put down, as also the hours of arrival and departure, have for days previously been known and have had the entire services of the railway officials directed on them. The transport has been likewise simplified from the circumstance of the field artillery and cavalry with guns and horses, usually proceeding in advance by the road.

To accelerate troops passing in and out of the trains, it would be needful to extend the ordinary lengths of platforms; and at places where there is but little traffic, temporary constructions might have to be provided. Some idea of the period required to remove an army of moderate size, may be gathered from the circumstance of an Austrian army of 40,000 men, 4,100 horses, and 700 guns and waggons, having been removed by rail from Olmütz to the capital Vienna, in the course of three-and-a-half days. Trains were worked from nine to ten each day, which should, however, be called double trains, since each included above 200 axles, so that the rate of transport should be counted at from 18 to 20 trains each day. The Prussian army continually endangered the line of railway, and there was frequent fear of seeing the trains cut off by them. These operations were materially hindered by the difficult approach to the small railway station at Olmütz, the defective returns of the number of troops to be carried, the perpetual throng pressing to the trains, and the partial obstruction of the line by accumulation of rolling stock.*

"During the Italian war of 1859, the main line of railway from Paris "to Marseilles, conveyed an average of 8,500 men and 500 horses

* Panz $\frac{M}{P}$ Lieut.-Col.

"daily. The Prussians, in 1866, within their own frontier, found that "it required a hundred trains to move 30,000 men, with their train and "baggage; and that it was rarely possible to move more than twelve "trains a day."* The previous arrangements for the preparation of trains for continuous military transport, of necessity occupy time; although when the distances to be conveyed are considerable, the gain is enormous. Not only are days saved by the rapidity of the movements, but the troops, by being spared long marches, are more effective on taking the field. When we consider the employment of railways for short distances, we do not find the same advantages presenting themselves; moreover, as the locality of the scene of operations is brought nearer, so does conveyance by railways incur such risks as usually to preclude their use.

Central and outer points, to be defended.

In the defence of a territory, Brialmont, in his "Défense des Etats," is of opinion that "While fortifying the capital, it is also "necessary in large countries to construct, between this point and the "frontier, places of refuge, offering to the defensive army the means, "if not of arresting the enemy, at least of sufficiently weakening his "resources in men and *matériel*, so as to lessen the force of his future "proceedings against the central redoubt.

"London has become so enlarged, that, according to the same autho-"rity, in his 'Défense de l'Angleterre,' in order to fortify that position "according to the requirements of modern artillery, it would be "neceesary to give to the outer lines and to the intrenched camp, such "large proportions, that the greatest part of the English army, great "quantities of *matériel*, as well as large sums of money, would be taken "up in this position, to the detriment of the army in the field, already "insufficient, without this increase of fortifications." Brialmont, further considers it would be necessary "To increase the fortifications "at Chatham; to construct a new fortress at Guildford, and to create "a great depôt, with a large entrenched camp, at Croydon. The "fortresses of Chatham, Dover, and Guildford, would thus occupy the "important debouches of the southern chain of hills; Portsmouth serv-"ing as an advanced position, would prevent an attack by the right "line of defence." Adopting this principle of defence, against an enemy who had effected a landing on the south coast, between Portland and the North Foreland, the defenders, after disputing step by step, would, if necessary, take post within the intrenched camp at Croydon.

In vol. ix., 1860, of the "Professional Papers," R.E., there appears a note by Colonel Jervois, R.E., in which that officer observes:— "That the fortification of the capital, provided there were funds for "accomplishing it, would rank in importance with that of the dock-"yards and arsenals, *on the land side*, but the great obstacle to esta-"blishing permanent works, for a defensive position round London, "that would be of any value, is the large outlay that would be requi-

* St. Paul's Magazine, March, 1869.

"site owing to the extent to which it must be developed to get "clear of suburbs which are rapidly increasing, and in the neigh- "bourhood of which the land is very expensive." The estimated expenses were at the time computed to be more than five millions sterling.*

Paris, since the addition of its fortifications, has gained great advantages; it is no longer open to invading armies, as it was in 1814 and 1815. Vienna, likewise, in 1809, was undefended and capitulated; also in 1866, it was unequal to oppose the advance of the victorious Prussians. It is now admitted, as a rule, that all capitals should be fortified.

The late Sir Howard Douglas, alluding to defensive positions covering Windsor and the metropolis, against an enemy from Hampshire and the south-western counties, was of opinion that "the chain of "heights, extending in a serpentine line from Finchampstead, in "Berkshire, to Guildford, in Surrey, comprehending the wide plateaux "of East Hampstead and Hartford-bridge, the Chobham and Farnham "ridges, and the range of chalk-hills called the Hogsback, constitute "choice positions."

Applying such views and principles of defence, to oppose the advance of an enemy who had successfully landed on any portions of the east, west, or south coasts, it might in general terms be laid down:—

1st. That the strategical positions immediately covering the capital, and situated on direct lines of approach towards it, should be protected by formidable defensive works.

2nd. That at important points, between the strategical positions and the coast, defensive works as places of refuge, pivots of operation, and points of support, for advanced corps of the regular and irregular forces combined, should also be prepared.

The choice of the sites for these defensive works and their description, which must be dependent on the features and nature of the ground, must follow certain rules and be in conformity with the requirements for tactical positions, for an army on the defensive: they should also command the debouches of high ground, the roads, the centres of communication and railways leading to the capital. The description of troops composing the principal portion of the forces, must also be of considerable weight in deciding on the most desirable portions to occupy, for the better employment and effectiveness of the particular arm; bearing in mind that elevated and commanding positions are usually to be preferred, the front and approaches being well overlooked and protected by artillery fire. In addition, obstacles within easy range and support from the line capable of defence, such as a stream, village, farm-house, or substantial buildings, will greatly strengthen the front of the line of battle.

The determination of the points to be held between the strategical

* "There can be no doubt that the main object of an enemy invading the country would be to push for the capital, in the hope that, if he succeeded in obtaining command of it, such a disaster would result in our buying him off upon any terms he might think it expedient to exact."—*Report of the Royal Commissioners.*

positions covering the capital and the coast, would be dependent on their adaptability for defence, as well as their relative positions, being at the junction of railways, which from the directions of the converging lines and their distances from the coast, *would be unlikely to be speedily interfered with*, or damaged by an enemy's cavalry or light troops. The capture of these points, whilst conferring special advantages on the invading army, should be requisite to enable its progress to be continued in the direction taken. Such selected posts should afford reciprocal assistance and support, and be capable of maintaining constant communications; they should also be connected by roads or lines of railway, facilitating the means of concentration in the direction of a threatened point. The organized resistance offered by means of these defensive works, if not immediately fatal to further progress, must at least postpone the grand struggle nearer the metropolis; damping the ardour and enthusiasm of the assailants by the severe losses which would be inflicted on them whilst engaged on such unequal terms.

Some years ago, it was proposed that a point be fixed upon near the centre of the kingdom, for the establishment of a great central depôt, wherein to deposit all necessary supplies and *matériel* for an army. This central depôt, far removed from any probable line of operations of an invading army, would not offer the same attraction and *double* object to an enemy for operating in the direction of the metropolis, as does the locality of the present arsenal of the kingdom, at Woolwich. From the great range of rifled artillery, it is evident that, unless surrounded by extensive works, necessitating the provision of a large force for a garrison, the principal arsenal of England could, with facility, be captured or destroyed by any force from *either* side of the Thames, whose onward movement from the eastward and southward had been so far successful. The insecure position of this arsenal is a serious error in connection with internal defence and the necessary supplies and stores for active operations, or the armament of our ships of war, land defences, and manufacture of warlike stores of all descriptions. A site further removed from the metropolis, to receive a portion of the present vast accumulations, would reduce the present risk incurred; future provision should also be made for the subsequent removal of the gun factories, carriage and laboratory departments. The cost of removal, and the temporary inconveniences, would be small indeed when compared with the irreparable losses, and perhaps still more serious results, which would be liable to occur on any near approach to the metropolis by an enemy.

Under such a system of proposed defence for covering the capital we should require,—

1st. The works for the defence of the strategical positions covering London, termed the central defences.

2nd. The defensive positions between the central defences and the coast, termed the outer defences, to serve as pivots of operation, points of support, and places of refuge, for the advanced portions of the army.

3rd. The fortified places in advanced positions on our coast frontier,

protecting our resources as a naval power, or serving as pivots of operation, also the central inland depôt.

4th. The land forces, computed at the present time to amount to 336,000 men, and composed as follows, viz.:—

The Regular Army of 86,000 men.

The Militia of 80,000 men.*

The Volunteers, &c., of 170,000 men.

With regard to the regular Army, the numbers above given could not be depended upon, as a considerable diminution might be expected on account of battalions required for colonial and imperial purposes, also for those detached in Ireland. The number of the battalions of regulars remaining in the country for internal defence is doubly important, as for each battalion that is removed, the number of effectives is not only diminished, but the relative proportions between the regular and irregular corps become changed, operating prejudicially on the efficiency of the combined forces.

Conduct of the Defenders.

By the aid of the lines of railway, from the interior towards the coast, and along the coast, the defenders would derive numerous advantages; those lines favouring the means for an early concentration of our forces, or for the despatch of advanced corps in the direction of the assailed points. Preserving and employing the lines of railway in their rear for their own exclusive use and benefit, and by obstructing the working of the parts of the lines which they are about to quit, by the removal of the rails and rolling stock, and by breaking up bridges, the defenders would render useless to the invaders, for at least some days, if not for a longer period, those portions falling into their possession. With the same object, roads would be broken up and rendered temporarily impassable; inundations would be formed from streams and canals; cattle, forage, grain, and all means of subsistence which an invading army would seize upon, would, as far as practicable, be removed or destroyed.

To enable the defensive army, in the vicinity of the metropolis, to take the offensive in any direction, free communication with both sides of the Thames, by means of the bridges, where such exist, elsewhere by troop and steam-boats, must be preserved intact. The passages of all important portions of the river below London, connecting Essex and Kent, such as Gravesend and Woolwich, should be guarded by *têtes-de-ponts*. These, constructed with proper dimensions, should efficiently protect retreating troops from the first attacks of the enemy.

On the invaders' line of advance every railway, embankment, hedge, farm-house, village, orchard, garden or wood and rising ground, should be turned to account by volunteer rifle corps; including the destruction or barricading of bridges and damming up of streams. These corps

* The expansion of the Militia would be urgently needed, in addition to any available Reserve Forces.

acting independently and, as far as practicable, in their own and adjoining counties, should not attempt to engage large bodies or compact masses of the enemy in the open field or enclosed country, but detachments only, composed of advanced guards, flanking parties, and escorts, opposed to which, from their local knowledge of the country, they could with advantage act. A system of partial and separate combats might with due precaution be adopted, every opportunity being taken to obtain cover when the configuration of the ground permitted, and to profit by natural or artificial obstacles; the retirements when pressed could be relieved by echelon formations. Every position, which from its natural or artificial strength and capabilities, would enable the progress of the invader to be arrested, should be successfully held, compelling them to halt and deploy, or to await the arrival of a force sufficient to dislodge the defenders. Yeomanry and volunteer cavalry, trained and armed as mounted rifles, might in such warfare render material and important services; at one time disputing the movements in advance, cutting off detachments, making prisoners, or breaking in on the flanks and rear of the enemy; at another covering the rear of their own retiring columns. Our volunteer forces thus judiciously acting and harassing the enemy, not seeking pitched battles with the trained soldiers of a military nation, would most favourably influence the general operations, and aid the combined action of the regular and irregular forces.

"Lord Wellington declared in 1809, that had the Spanish preserved "their two armies, or even one of them, the cause was safe. The "French could have sent no reinforcements which could have been of "any use; time would have been gained, all the chances were in favour "of the allies; and in the first moment of weakness occasioned by any "diversion on the continent, or by the growing discontent of the "French themselves with the war, the French armies must have been "driven out of Spain. But, no! nothing would answer excepting to "fight great battles in plains, in which their defeat was as certain as "was the commencement of the battle." *

Napier in his history of the Peninsular War thus observes, as to the Spanish troops, in 1809:—"The Spanish troops were not serviceable "in proportion to their numbers, most of them were new levies, the "rest ill-trained; the generals had lost nothing of their presumption, "learnt nothing of war, and their mutual jealousies were as strong as "ever." †

"The experience which Sir Howard Douglas acquired during the "Peninsular War enabled him to assert with confidence, that neither "the regular army nor the bands of volunteers alone would suffice to "save the country from the ruin in which a successful invasion would "result; and that, to obtain this end, both of these means of defence "must be judiciously combined. Those who, like Sir Howard, witnessed the prodigious influence which the desultory warfare carried "on by the people of Spain, without discipline and almost without "arms—but supported by the gallant army under the Duke of Wel-

* Wellington Dispatches. † Vol. ii.

"lington—had in delivering that country from the invasion of their "powerful neighbours, will not feel a doubt that the like desultory "means employed in this country, in combination with and aided by "the support of the regular troops and militia, will baffle any effort "which may be made to subjugate it, by a foreign army, however "powerful that may be."

Frederick the Great, by means of his intrenched camp at Buntzelwitz, with 60,000 men arrested 100,000 Austro-Russians, and caused them at length to retreat. The celebrated lines of Torres-Vedras covering Lisbon, afford a splendid illustration of the great security and power of resistance to be obtained from a well-selected position; strong by nature and strengthened by field works, with free communications and flanks secure. Within these lines, Wellington and his army taking post, arrested the victorious onward movement of the French armies, after the Spanish had been defeated in several battles, and driven from the field.

MOVEMENTS, ETC., OF LIGHT INFANTRY.

(*Not yet adopted.*)

By Major T. Lynden Bell, 1st Batt. 6th Royal Regiment.
Rawul Pindee, June 29th, 1870.

Form Light Infantry Order, Three Companies Extend.

From Quarter Distance Column preparatory to an Advance.

Extend three companies by an outward movement in double time, direct to flanks, on the line of the quarter distance column as it stands, make extension in fours, the front rank, not the near rank men being responsible for their distance.

Centre support (4th company) to lie down.

Flank supports to move outwards in fours in double time, halting in rear of corresponding companies of skirmishers, but two-thirds of the distance towards the flanks, not in rear of their centres.

The reserve to lie down on its own ground, supports and skirmishers to do the same immediately on getting into position, the former by word of command, the latter file by file.

Note.—This mode of extension is used in preference to that laid down in the Field Exercise book, because in the latter you make a forward movement (in presence of the enemy, it may be) and risk an encounter with the enemy before your formation is complete.

Detail of Organization.

Sections to be considered units of defence against cavalry when they attack a line of skirmishers.

Each section-leader personally to command his section under orders of Captain.

The line of skirmishers to be under command of the Major of the leading wing.

Each section-leader to have power to detach a man when required for communication with Captain of company.

Each Captain to have two Orderlies (one for each sub-division).

The Major commanding first line to have one Orderly from each company skirmishing; each support to throw out one connecting link.

Each Captain of supports to have one Orderly.

Post of Commanding Officer to be in rear of centre support; Commanding Officer to have two Orderlies.

Supports to communicate with Commanding Officer, who will give orders to reserve.

Reserve to be under Major of rear wing, who will throw out two Orderlies for communication with Commanding Officer.

Advance from first situation in Skirmishing Order.

A few men of each section to move out rapidly, but cautiously, on nearest cover, which seized, the remainder to follow, and either re-inforce the cover already taken up, or take up fresh keeping line as nearly as possible.

Major to direct next advance through Captains of companies, &c., or to order a pause if he sees fit.

Skirmishers to have bayonets fixed whenever in close proximity to an enemy, and when moving rapidly to slope; whenever halted or holding a position, to get as much under cover as possible.

Supports to move with unfixed bayonets at the slope, or to march at ease; when halted, to lie down.

All advances and re-inforcements to be conducted on the foregoing principles.

Retiring from a position in Skirmishing order in presence of the enemy.

Withdraw man by man, or file by file of sections, stealthily but rapidly, to next tenable cover in rear, keeping up a show of resistance till the last; then move last men as fast as they can go, to new position, and open fire on the old one when occupied by the enemy.

Enemy pressing, supports to take up defensive position in extended order in rear; retire upon them from cover to cover, file by file (or man by man) cover being always taken up in rear before the advance post is entirely abandoned.

Line of defence formed by supports gained, open fire from it with all hands.

If advance of enemy is successfully repulsed, move one lot of companies into defensive positions in support; if repulse is not decisive, continue retirement with double numbers, and dwell longer at points of resistance.

Pass the word to extend reserve in rear, and send to main body for assistance.

Skirmishers Attacked by Cavalry.

Form at once Section-rallying-squares, not necessarily squares however, men to get their backs against any rock or object that cannot be turned; kneeling rank to fire according to circumstances until almost in contact with the enemy.

Supports to form two deep squares, and then to be dressed out into circles, so as to avoid salient angles, which are in themselves defenceless, or they can form half circles, with twice as large a front of fire, if they have a background of rock, trees, &c., which cannot be turned.

To be in echellon is good, but, whether in echellon or not, make a rule, *never to fire without a reasonable hope of hitting an adversary at whom one has first deliberately aimed, and again never to fire when there is a chance of hitting a comrade.*

Note.—Sections ought to be strong enough for independent action against cavalry; section rallying squares present four points of resistance instead of one, are formed in one-fourth of the time taken by a company, can re-form line in one-fourth of the time, are under closer supervision than ordinary "happy-go-lucky" rallying squares, where in the hurry one's mind is distracted, not knowing whether it is best to go with Smith to the right, or with Jones to the left; besides company squares could not be formed in a first line of defence without great risk of loss to the outsiders.

Changes of Front.

Changes of front should be gradual, and at a small angle; in no case should the line of retreat be exposed.

The Major of the leading wing ought to *direct and carry out* such changes as may become necessary from circumstances, of which he is the best judge; he is of course immediately to report his having done so to the Commanding Officer, who will direct Supports and Reserve to conform.

An attempt to Turn the Flank by the Enemy.

Should be opposed thus:—Say right flank is threatened, the Centre Support to take ground ground to right and extend in such a manner as to re-inforce the old Right Skirmishers.

The Right Support to move so as to extend to the *right rear* of old Right Skirmishers.

Pass word to rear for assistance, and move one company from

Reserve to take the place of Centre Support, another similarly to *right flank rear* of old Right Support, which is now extended in direct echellon to the rear of old Right Skirmishers.

To turn the Enemy's Flank.

The flank which it really is desired to turn, should be quietly re-inforced by several companies of another battalion, under cover of a feigned advance with re-inforcement and much demonstration on the other; it would be well, however, to have some companies of the fresh battalion on that flank also, in order that should a decisive advantage be gained in the sham attack, the same may be utilized. The real attack might still go on, as it is better to turn *both* flanks than to turn one, but the feigned attack should commence *first*, in order to draw the attention of the enemy from the one which is intended to succeed.

A Quarter Distance Column ordered to cover retreat of a Brigade or Column of Route.

If not (as is supposed) in immediate contact with the enemy, to move to covering position and extend as already described, supports and reserve retiring to regulated distance with column, then, halting, lying down, and disputing the ground as also already described, giving time to the brigade to form line of battle in rear; the intervals between battalions in line of battle should be increased to twelve paces. Line of columns should never be more contiguous than twelve paces, for many obvious reasons.

Covering Retreat of a Brigade in Line of Battle by a Battalion of said Brigade.

Form quarter distance column in double time on company nearest centre of brigade. Form light infantry order in rear.

Then retire brigade in open columns from flanks of companies, and either take up line of battle in rear, or close to line of columns on march, at such interval as will permit of their being wheeled into a front of quarter-distance-columns, with intervals of twelve paces.

Reserve Ammunition, Entrenching Tools, &c.

Double the number of pioneers, and arm them with breech-loading revolvers and good cut-and-thrust swords; give them each a useful knife, some strong cord, gun spikes, a hammer, and some nails. Have two pack-saddle mules to each company, each led by a muleteer.

One mule to carry first reserve of ammunition, the other an assorted lot of light entrenching tools, axes, saws, &c.

Have the ammunition boxes made so that the ammunition can be got at in a moment. Let one pioneer superintend the distribution of tools, and the other that of ammunition. Pioneers and mules to keep with their companies.

It is needless to add that, besides throwing up works of defence, the tools would be available for hutting purposes, cutting fire-wood, &c.

Provide every soldier with a flask large enough to contain a wine-bottle of water; make it imperative that he has it filled before going into action. Give him a knee cap (to save his trowsers), an empty sand bag, with cord and a trowel (these last have been often suggested by others, but are so essential that mention of them cannot be avoided).

Lastly, dispense with bugling in light infantry exercise, for although things may not be done on the instant, they will be done better.

Light infantry requires special training and individual intelligence, and is consequently different from battalion drill, in which the soldier is part of a machine, and obeys the command, *but has no business to think.*

[Major Bell will find that many of the recommendations in the foregoing paper have been anticipated in the Revised Field Exercise of 1870.—Ed.]